JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION

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American Statistical Association

Organized November 27, 1839
Incorporated 1841

The American Statistical Association is a scientific, professional, and educational organization. Its membership is not confined to professional statisticians but includes economists, business executives, research directors, government officials, university professors, and other persons who are seriously interested in the application of statistical methods to practical problems, in the development of more useful methods, and in the improvement of basic statistical data. Engineers, mathematicians, biologists, actuaries, sociologists, psychologists, and representatives of many other professions are included in the membership of the Association. Further information about the Association and membership application forms may be secured from the Secretary, Frederick F. Stephan, 722 Woodward Building, Washington, D. C.

The Ninety-ninth Annual Meeting of the American Statistical Association will be held in Atlantic City, New Jersey, December 27 to 30, 1937. With a few exceptions the sessions are open to the public.

Chapters of the Association have been organized in important cities in the United States. Information concerning the meetings of these chapters may be secured from the District Representatives listed on another page.

The Editors welcome the submission of articles and notes for possible publication in the JOURNAL. Manuscripts should be sent to the Editorial Office, Journal of the American Statistical Association, 722 Woodward Building, Washington, D. C. Books for review should be sent to the Review Editor, Ralph J. Watkins, Bureau of Business Research, University of Pittsburgh, Pittsburgh, Pennsylvania. Authors who wish suggestions about the preparation of manuscripts and charts or information about editorial policies should address their inquiries to the Editor.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of Journal of the American Statistical Association published Quarterly at Menasha, Wisconsin for Oct. 1, 1935 to Oct. 1, 1936.

District of Columbia } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Frederick F. Stephan, who, having been duly sworn according to law, deposes and says that he is the Editor of the Journal of the American Statistical Association and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Statistical Association, 722 Woodward Bldg., Washington, D. C.; Editor, Frederick F. Stephan, 722 Woodward Bldg., Washington, D. C.; Managing Editor, None; Business Managers, None.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) American Statistical Association, 722 Woodward Bldg., Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily publications only.)

FREDERICK F. STEPHAN, Editor.

Sworn to and subscribed before me this 28th day of November, 1936

[SEAL.] RUBY J. PETERSON
(My commission expires 12/28/1938.)

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STATISTICS AND SOCIAL ENGINEERING*

By Joseph S. Davis
Food Research Institute, Stanford University

ONE EVENING twenty-eight years ago a beloved New England clergyman, rich in humor and wisdom too, put before a Harvard group of scholars what he termed "A Modest Proposal."[1] He urged the founding of a new graduate school "for the retrogressive re-education

* Presidential address at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, December 29, 1936.

Professor Walter F. Willcox' introductory remarks were:

"This evening we are to enjoy addresses from the presidents of Societies devoted to the study of statistics, politics, labor legislation, economics, and sociology. Fifty years ago such an evening would have been given over to one address perhaps an hour and a half long; and never before, I believe, have more than three presidential addresses been made at one session. Each of tonight's addresses will be shortened to twenty minutes; my main duty will be to hold the speakers to their allotted time.

"Perhaps this multiplication of addresses reflects something more than the multiplication of Societies since the founding of the American Statistical Association in 1839 and the diversification of specialties during the century that has intervened. These five addresses at one session may indicate that a close cooperation of them and other related societies is at hand and foreshadow the merging of thesis and antithesis into a new synthesis. The older politics, economics, and law, even the sociology made familiar to our youth by Herbert Spencer, were all based on the individual as the social atom. The politics, economics, and sociology of today are based mainly on the group; perhaps in future law also will find a similar basis and John Doe and Richard Roe lose their places of honor. This change of the unit of study explains why statistics, the numerical study of groups, is preëminent among modern methods of social study, and why accordingly the newer phases of politics and law, economics, and sociology, rely as never before on statistical methods and find therein a higher unity. The nineteenth was once called the statistical century; perhaps in future the same phrase will be applied with greater truth to the twentieth. At least the addresses which you will now hear have whispered this suggestion to one whose major interest for half a century has been in statistics as a method of study in all the social sciences." [Ed.]

[1] Samuel McChord Crothers, in *Harvard Graduates' Magazine*, June 1909, XVII, 607–11.

of doctors of philosophy." "At the present rate of advance," he said,

> "it is possible for our universities to turn out fleets of intellectual Dreadnaughts whose draught does not allow them to navigate in safety the home waters.
>
> "In the Retrogressive School there will be the opportunity to make the necessary adjustments to the actual situation which under ordinary conditions are more or less painful . . . The course in Comparative Literature will be supplemented by a half-course in Comparative Illiteracy . . . There will be courses on the Superficial, the Obvious, the Hit-or-Miss, the By-and-Large, the Topsy-turvy, the Go-as-you-please, and the other forms in which Truth appears to the ordinary intelligence . . . [The student] will attend lectures on the Heterogeneity of the Miscellaneous, the Unexpectedness of the Inevitable, and the Historicity of the Contemporaneous . . .
>
> "Through various kindergarten devices he will be taught the great truth embodied in the philosophical maxim, 'This is a rum world.' . . . "

These few excerpts will perhaps convey Dr. Crothers' idea. Though humorously put, it had a serious core that was by no means devoid of merit. His plea did not fall upon deaf ears, but it opened no safe-deposit boxes and buttered no professor's parsnips. Long since it has slumbered forgotten in the files of a defunct magazine.

I

Undeterred by the fate of this former proposal, I venture to make another, perbaps less modest and certainly more serious, for the establishment of what I shall call Schools of Social Engineering.

For decades our universities have had, alongside departments and schools of the natural sciences, other schools or departments of engineering and medicine. Professors of physics, chemistry, and biology are flanked by colleagues who concentrate on applications of natural science to serving men's manifold needs and curing or preventing their diseases, and on training engineers, architects, doctors, and surgeons to practice their professions in transforming a "rum world" into something less "rummy." The progress of pure science, and the contributions of engineering and medicine, have been mutually invaluable. Largely as a result, they are revolutionizing our world at marvelous speed, until today there are many who tremble because society can ill adapt itself to so fast a pace of social change.

J. M. Clark, in his stimulating presidential address last year,[2] warned that "the world will not give us unlimited time to work out the answer" to the crucial question whether our social system can be refashioned so as "to use the productive powers . . . so plentifully developed, and to give everyone an opportunity to produce and to earn a

[2] "Past Accomplishments and Present Prospects of American Economics," *American Economic Review*, March 1936, XXVI, 1–11.

living." Rightly or wrongly, I interpret him to mean that we social scientists have this pistol at our heads. As a social scientist—for better or worse—I cannot accept this implication, or fully endorse Broadus Mitchell's "blast": "The business depression points an accusing finger at professional economists."[3] Individually, and as a profession, we have unmistakable shortcomings; but we cannot accept responsibility for the depression or for setting the world right. We have other fish to fry, as Clark indeed pointed out; and the more-and-better fish that we fry are required to nourish a new profession that we can help to breed and mature.

I submit that our departments of economics, political science, and sociology should be flanked by departments or schools of social engineering, economic medicine, political architecture. There specialists in solving social problems could be trained and research directed to such practical ends could be carried on. There is room for social engineering workshops to parallel our engineering laboratories. On the educational aspects of my rash proposal, I cannot elaborate here; and if I seem to make bold leaps across yawning voids, it is because I am desperately trying to keep in step with the inexorable march of time.

Let us, however, frankly recognize the distinction between pure science and its applications, in our field as in others. We do not expect a physicist to build a bridge or a biologist to treat cancer. No more should we, if we are primarily economists, political scientists, or sociologists, set out to be social engineers or social doctors. If our social structure creaks and groans and suffers breakdowns, we should find out what is the matter and why, and we should seek to develop sound principles of social structure; but if we take it upon ourselves to lubricate, repair, remodel, or rebuild this structure, we shall only betray our unfitness for the task. If our "acquisitive society" is sick, we should analyze the pathological condition and try to develop therapeutic principles; but we ought not to write prescriptions and make bedside visits. If our civilization, as catastrophists assure us, is tottering to its fall, we shall prove pygmies instead of Samsons if we undertake to carry lumber to shore it up. If some among us choose to change their profession, let them do so, but do it with their eyes open. The rest of us have indeed a responsibility and an opportunity; but it lies in helping to build up new professions to perform such tasks, instead of amateurishly tackling them ourselves or leaving them to be bungled by quacks outside our ranks.

Already these professions are beginning to emerge. Incidentally and

[3] "A Blast Against Economists," *Virginia Quarterly Review*, April 1931, VII, 186.

occasionally, our universities are helping train a few vigorous neophytes. But where, in the field of applied social science, are the counterparts of those who have built our lofty skyscrapers, our magnificent highways, our automobiles and airplanes, our Boulder Dam, and of those who have well-nigh won the campaigns against smallpox, typhoid, and tuberculosis? Harnessing the social tides may be more remote than putting Passamaquoddy to work; but surely the arts of building *social* dikes, bridges, and highways can be mastered no less than the arts of fence-fixing and log-rolling. These are not mere metaphors; they correspond to concrete realities. There is urgent need of well-trained, specialized professionals who will concentrate on specific means of correcting our economic, political, and social defects, thereby transforming this half-crazy world into something less topsy-turvy.

In recent years the word *planning* has been dinned into our ears. Social planning, economic planning, national planning—these have been phrases to conjure with. In our midst are devotees, indifferents, and arrant enemies of this new cult, with its amazing conglomeration of doctrines. With applied social science just striving to be born, governments have embarked on large-scale social planning. In effect, they have said: "Go to, let us build a new world. The materials are all here. We have only to set about it with a will." This is not the spirit of the scientist or the engineer. We do have the requisite basic materials, and our brain power may be as great today as it will be later; but of the requisite techniques and skills, much must be learned before the more ambitious tasks can be successfully performed. Only by degrees have bridges replaced ferry boats of improving type. In the stage that the engineering art had reached fifty years ago, it would have been disastrous to attempt to build the San Francisco Bay Bridge. It is no less disastrous today to attempt to build its social counterparts while the technique of social engineering is in its present stage.

In the quasi-religion of social planning, however, I see indications of cravings for the services of real social engineers, who will not only plan and execute but bring constructive plans to successful execution, and of social doctors, who will not only prescribe and treat but really cure social ills. In the next fifty years, I make bold to prophesy, the profession of social engineering, under some name or other, will come to rank with those of medicine, law, and engineering; and the development of this profession will prove as fruitful to the progress of social science as developments in engineering and medicine have been to the progress of the natural sciences.

To avoid misunderstanding, let me say that by social engineering I do not mean public administration, nor imply that the profession

must be or will be practiced only in the government service. On the contrary, I hold that, in democratic societies, its major development will be outside, just as has been true of civil, mechanical, and electrical engineering, medicine, and surgery.

Time limits forbid me to introduce more academic qualifications or to answer your unspoken objections. If I may say it, with due reverence and respect, God seemed willing and your patience might permit, but it doesn't fit into the planned economy of this session. Let me therefore pass, without further ado, to the question: What is the relation between statistics and social engineering?

II

As we all know, "statistics" is a word of multiple meanings. Sometimes it means *statistical data*, in crude, refined, or elaborated forms. Sometimes it means *statistical methods*, from the more elementary, which all statisticians are supposed to have mastered, to the more refined, before which many of us are still illiterate.[4] Sometimes it means the *statistical process* of solving problems with the aid of statistical data and methods.

Statistics may or may not be one of the essentials of modern social science. I think it is, though there is place for social scientists who realize that they know nothing of statistics. At all events, statistics is basic to social engineering. Perhaps nowhere else, even in business and government, is the proper utilization of statistics more truly vital. Representing a statistical association, I can appropriately emphasize this point; but I do so without claiming priority for statistics, or elevating it to a position of unique importance, in the training and practice of the new professions. I do not mean that one must master all known statistical techniques before he can qualify as social engineer or social doctor, any more than a qualified civil engineer must be a Ph.D. in physics or a reputable physician a Ph.D. in anatomy or physiology. I do mean that a thorough grounding in statistics is no less essential for entrants into these new professions than engineering sciences are for would-be engineers and pre-medical courses for budding doctors; and that statistics must be constantly called into play in the practice of these newer professions.

To more learned statistical brethren I leave elaborations on the importance of refinements in statistical technique. My silence about these implies no disparagement. In the actual use of statistics, however, the more elementary principles are called into play hundreds of times

[4] Compare the presidential address a decade ago by Leonard P. Ayres, "The Dilemma of the New Statistics," *Journal of the American Statistical Association*, March 1927, XXII, 1–8.

more often. Simple though these may seem, it is distressing to find how commonly they are violated. I speak of such things as discrimination between good data and bad, the proper use of aggregates, averages, and indexes, construction of tables and charts, and other phases of the "art of statistical exposition"—the everyday tools of one who uses statistics.

One of the grave defects in our elementary and university education is that pupils "cover ground" without really mastering the rudiments. Students emerge with college degrees who cannot add, subtract, multiply, divide, spell, punctuate, and make sentences with a fair approach to accuracy.

In the field of statistics corresponding defects are all too common. Students compile data not worth compiling, manipulate data not worth manipulating. They compute arithmetic means, medians, and modes, but too often without learning where each is appropriate, what care to exercise with respect to the data averaged, and when any sort of average is only misleading. They use adding machines to arrive at huge aggregates, ignoring what Dr. Crothers called the "heterogeneity of the miscellaneous." They apply formulas for computing trends, often blind to the fact that what they have computed utterly fails to indicate a true trend. They work up indexes on the unethical principle of *caveat lector*. They compute coefficients of correlation without realizing what these mean or when they have no meaning. They confuse mere association with causal relationship. They apply methods that produce confusing or misleading results, which they themselves are unable to recognize at their true worthlessness. They learn procedures of meticulous checking, and perhaps apply them assiduously, but remain ignorant of the higher art of super-checking by which flagrant mistakes can be detected. They calculate standard errors, but overlook multitudes of sub-standard errors. In a word, they "strain at a gnat and swallow a camel."

Unfortunately, this diatribe of mine does not apply to students alone. I doubt if any group of workers has a larger representation of experienced gnat-strainers and camel-swallowers than those who deal with or dabble in statistics. Indeed, the American Statistical Association has its quota of them, and its justification for existence lies partly in trying to overcome such defects. There is increasing need for statistics—for estimates and guestimates, for forecasts and backcasts, so long as the nature and basis of each is made clear. But we have too much of hit-or-miss-statistics. Statistics are proverbially dry—forgive me if I say they are far better dry than "wet"—but to give them opti-

mum moisture content is simply a matter of mastering fundamentals that no one should hold in contempt.

In purely academic activities such shortcomings as I have noted are serious indeed, but their full seriousness is not readily revealed. In the applications of statistics in social engineering, however, practices are put to acid tests. If the bridge-builder underestimates the strains to which the structure will be subject, overestimates the extent to which foundations, abutments, and cables will stand stresses of various sorts, and fails to provide an adequate margin of safety, the bridge will fall. If he makes the opposite mistakes, the cost will be excessively increased. It is similar with the builder of new social structures, small or great; defects of calculation and estimate lead to waste if not to destruction.

You will see that I am no Pollyanna. Neither am I a prophet of disaster or doom, and I cannot close on a critical or pessimistic note. I envisage the rise of a new profession of social engineering, with a future truly great. To its development we social scientists have much to contribute, and from its progress social science has much to gain. In the training and practice of that profession, right use of the rudiments of statistics is one of the bed-rock essentials. In the constructive work of the American Statistical Association, one of the most worthy objectives is to promote the effective linkage of statistics and social engineering.

CORPORATION STATEMENTS AS THE BASIS OF INVESTMENT POLICY*

By Laurence H. Sloan, *Vice-President*
Standard Statistics Company, Inc.

Expressing only the viewpoint and desires of the investor, as he is sometimes called, and ignoring entirely the corporation's viewpoint and interests, the following are among the important attributes which an official corporation financial statement should possess:

1. It should be truthful.
2. It should state the truth clearly, plainly, and adequately, so that all of those who have a financial interest in the situation would have the same understanding of it.
3. It should report the truth with reasonable promptness.
4. It should convey truthful information to *all* investors *simultaneously.*
5. It should provide the basis for *forecast* of future earnings and dividends.

In a moment we shall return to these various badges of virtue, inquiring as to their practicability, as to whether the situation is tending toward improvement or deterioration, as to what can be done about the matter which is not already being done or attempted, and so on.

But before doing so, it may be well to scrutinize one popular illusion and to raise one rather unpleasant, but essential, question.

The popular illusion is that income accounts and balance sheets can be devised and presented in such a way that they will prove a valuable guide to the so-called "average investor." The average investor himself is perhaps an illusion. But if he does exist, he must be of no better than average intelligence, and raw corporation financial statements are not for the like of him. They are technical instruments in their very nature, drawn by experts and mainly for the use of experts. What the mythical average investor needs (if anything) is an *interpretation* of the financial statement. One gets nowhere at all with a discussion of the needed improvements in such documents until the so-called average investor, with his average powers of mathematical comprehension, is erased from the picture.

That brings us to the question of the function, as contrasted with the purpose, of the corporation financial statement.

* A paper presented at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, Illinois, December 28, 1936.

In the discussion at Washington which formed a back-drop for the passage of the 1933 and 1934 Securities Acts, the phrases "protection of the investor" and "welfare of the investing public" were often used. Certainly the public welfare would be furthered by choking off the supply of bad new issues, if that could be done, because instruments of this sort occasion a sheer waste of capital, and that does no one any good. But there is really some question as to whether truthful, adequate and prompt financial information, via the route of corporation statements, contributes to the welfare of the *entire* investing public. The basis for this question arises from the fact that the investing public as a whole has only itself from which to buy securities, and only itself to which to sell securities.

This being the case, it is rather difficult to figure it any other way than that good financial information relative to a given corporate situation abets the wise investors in taking advantage of the mistakes of the unwise ones. If at the peaks of bull markets we Americans could sell our securities to the Chinese or Fiji Islanders, and buy them back again at the end of bear markets, there might be at least a *national* advantage thus to be gained.

But it doesn't work that way. In the main, we can sell only to each other and buy only from each other. In theory, although not always in practise, adequate financial information merely enables the informed investors to buy from the fools at the right time (that is, at the right time in the informed investor's reckoning) and to sell to the fools at the right time.

This is not an academic question. It so happens that both in connection with new offerings and with annual statements, a great deal of important information, not otherwise available, is filed with the Securities and Exchange Commission at Washington. The investor who can afford to have this extracted, summarized and analyzed, certainly has some advantage over the investor of the so-called average type who doesn't know the information is "available" at Washington, who never thought of sending to Washington for a photostatic copy of anything, who wouldn't know what to ask for anyway, and who wouldn't know what to do with it after he got it back.

Now back to our list of desirable attributes for corporation statements. Point No. 4, stressing the desirability of all investors receiving truthful information simultaneously, is idealistic and thoroughly impractical. To insist that stock or bond owners of Corporation X should receive important financial information relative to the corporation as promptly as it is received by those security owners who are members of the management (i.e., the well-known insiders) is to insist upon one

of two impossible circumstances: either (a) daily, weekly, or at the outside, monthly statements to the public, or (b) that the management itself shall not keep itself informed up to the minute about the company's affairs.

You can talk all you want to on the subject, and you can pass as many laws as you want to, but the fact still remains that there is absolutely no way, as our economic mechanism is now set up, to prevent the insiders from being ahead of the mob in the matter of corporate knowledge, and there is probably no way to keep them from profiting thereby.

So that brings us to the desirability of financial statements issued with *reasonable* promptness. That term can be defined, for our present purposes, with considerable definiteness. It means a *quarterly* financial statement, issued not more than six weeks after the end of a quarter. Such a requirement would seem to be both a reasonable and practical one.

All of the objections are by now quite familiar . . . the alleged deceptiveness of quarterly statements reporting the condition of a business that is highly seasonal; the difficulty of gathering data from abroad by corporations with an international complexion; the expense of frequent inventories and audits, etc.

The plain truth of the matter is that an annual statement, issued four to six months after the close of the fiscal year, and therefore reporting a situation which had its beginning 16 to 18 months earlier, is thoroughly obsolete in our present day investment machinery. Many corporations which do not now report quarterly could readily do so, without harm to their trade position, and without significant additional expense. Hardly anyone is so unsophistocated as to believe that the corporations which still report only once a year do not privately compute their positions much more often than that.

The Securities and Exchange Commission has been vested with the power to require registered corporations to render quarterly reports. It is this speaker's uninformed forecast that many corporations which do not now report quarterly will be doing so before the end of 1937.

As regards the basic truthfulness of corporation statements, it may be flatly said that the establishment of the Securities and Exchange Commission, with the body of legislation which governs its powers and actions, has for all practical purposes completely eliminated outright fraud and conscious deception from the income accounts and balance sheets of registered corporations. The penalties of violation are too severe to make the violations themselves seem worth the candle to most corporation executives and accountants.

In other words, this phase of the matter is now in the nature of a closed book. Conscious fraud has been legislated out of corporate financial statements; the legislation enjoys quite a high degree of success.

But even after the elimination of flagrant misstatement, the consumer of corporation statements still has a thoroughly adequate opportunity to misinform himself. He may do so without the reporting corporation having evaded by so much as a hair's breadth any existing law, and without the accounting profession having violated even the smallest item in its existing code of ethics.

To begin with, the statements which corporations still send to their security owners are not always identical, by any means, with those which are filed at Washington when a new issue is offered, or regularly once a year on the well known Form 10. Form 10 provides for the expression of truthful financial facts with reasonable clarity and adequacy. Expert analysts often want more, in specific cases, but broadly speaking, Form 10 information meets the run-of-mine of reasonable or average requirements. But many corporations still reserve the adequacy and clarity of Form 10 information for the SEC; stockholders are still receiving those briefer and more tricky statements which were a part of the financial trappings of an earlier era.

This is a significant fact, but not one of over-powering importance since, technically at least, the more complete information *is* available.

More important is the fact that established accounting practise, and trends of thought and theory within the accounting profession itself, still leave ample room for misinterpretation and misunderstanding. It may be said without fear of dispute that fully half the items in both the income account and balance sheet are set up not on the basis of incontroversial fact, but on the basis of someone's judgment or opinion as to proper accounting practise.

We all know how reserves for depletion and depreciation are made to vary, not only from one company to another, but within a given company from one year to another. We all know how significant an effect upon reported net earnings results from arbitrary variation in this single item.

The handling of inventory reserves can result in a similar distortion of reported earnings. Under the cover of unexplained debits against surplus or credits to surplus, can exist a veritable multitude of accounting sins.

I am not going to explore this particular avenue in further detail, because I fear that to do so would be to trespass upon what Mr. Sachs is going to talk about. The present purpose will have been served if we

merely note in passing that we have not yet reached the absolute in the way of wholly satisfactory corporation statements, even though we have been making giant strides in that direction during the past three years.

Finally, we come to a brief examination of the *forecast* significance of corporation statements. Forecast of corporation earnings and dividends is the objective of all investment analysis, whether it is called by that blunt name or some other. The intelligent investor does not examine a statement merely to gratify his curiosity as to whether he should have bought or sold a year ago, or six months ago, or even yesterday. He examines it with the idea of forecasting a future trend, so that he can know what action to take today or tomorrow. In any event, he forecasts.

That are no statistics which reveal the volume of security transactions which is directly stimulated by the publication of official statements. But I am sure the amount of dealings so originating is very, very small. The whole modern conception of expert investment analysis is that it should be forward looking; that it should provide itself with tools for determining action *between* the issuance of official statements. This applies not only to the short term trader, or speculator, but to the long pull investor as well. In fact, the so-called long pull investor is almost as mythical as the average investor. Outside the institutions—insurance companies, trust companies, banks, etc.—about the only long pull investors who really exist are the ones who can't do any better than that. They would much prefer to do the job in a short time; probably 99 per cent of them *hope* to do it in a short time; they become long pull investors, in the main, either when they find themselves locked in by a severe price decline, or when the short term movement for which they hoped fails to mature.

And even the most Simon pure of the long pull investors can offer no justification whatsoever for re-checking his commitments no more often than at statement issuing time. There could be no quarrel with the assertion that many institutions now and then do a terribly bad job with their forecasts, but that doesn't mean that they sleep comfortably with their securities for a year at a lap, with no effort at an intermediate check.

What is the basic nature of the type of forecast here under consideration? Simply this: to so understand the affairs of a given corporation that outside events, which occur between statements, may be used as the basis for intelligent conjecture as to their probable immediate and future effects upon the earnings of such a corporation.

Two examples will make the meaning clear.

Between October 24 and November 6, 1936, the domestic price of copper was advanced ¾ of 1 cent—a very stiff advance, for this particular market. This provides the basis for the very simplest type of investment forecast. Even the least imaginative customer's man in Wall Street could lift his telephone and flash the obvious news that an increase in the profits of the domestic copper producers was indicated.

The matter becomes considerably more complex, however, when we are dealing with events which affect the producers of multiple products. What does an important increase in automobile truck production, as revealed by the monthly figures of the Department of Commerce, mean to a company such as International Harvester, which is a large scale producer of trucks *among other things*, but which issues financial statements but once each year?

For purposes of that segment of investment analysis which aims at forecast, perhaps the most important *single* item in the financial statement is gross income. If, in addition to *net* income, the informed investor can know the gross amount of money which comes into the till over a given period of time and under a given set of conditions, his task of estimating net under *altered* conditions is greatly facilitated.

Equally important is a break-down of gross, showing the precise amount of money from the sale of each product, the amount of income from each investment, etc.

Most corporations object to publication of gross income figures. A relatively small percentage of those which disclose this information do so willingly. Slowly the list has grown over a period of years, as the requirements of the New York Stock Exchange have become more rigid. Form 10 at the Securities and Exchange Commission has disclosed this item in certain additional cases, but for the most part the corporations which have vigorously resisted the publication of gross have, up to date, been able to convince the Commission of the desirability of still maintaining these data confidential.

Apparently the investment community will have more gross income figures in 1937 than in any previous year.

Publication of a break-down of gross is even more vigorously resisted than is publication of the aggregate figure. There is no current evidence that public authorities have any intention of pressing this phase of disclosure very much farther. Over a long period of time this information, in approximate terms, and applicable to the majority of important corporations has found its way into the public and confidential records of the investment community. Seemingly this unofficial, word of mouth, back-door type of gross break-down is the most that can be expected for some time to come.

As a corporation official I should actively oppose publication of a break-down in gross, for many obvious reasons; as an investor, I cry aloud for this information. It is very desirable—indeed, virtually essential—for the interpretation of events which fall between the issuance of statements. Lacking the exact details, a reasonable approximation is obviously better than no information at all. In any event, informed analysis starts from a knowledge of how much money comes in under a given set of conditions, and of where it comes from. Such information is germane not only to the careful investor's long term policy, but to the definitive market action of the wise investor, as previously characterized and described.

The entirely perfect financial statement, the ideal one in the viewpoint of the intelligent investor, probably will never be. What the careful and informed investor regards as ideal would conflict too sharply with reasonable and defendable corporation policy. However, many of the faults and shortcomings of corporation statements are in the way of being cured. Additional curative ministrations are in prospect. It would be both an unfair and an uninformed observer who did not give a large share of credit for this improving situation to the intelligent work of the Securities and Exchange Commission.

STATISTICAL REQUIREMENTS OF THE SOCIAL SECURITY BOARD FOR EFFICIENT ADMINISTRATION*

By Arthur J. Altmeyer
Chairman, Social Security Board

This is a subject which is of concern not only to active participants in the social security program, but also to many on the outside who have either a direct or an indirect connection with social security. For the past year the Social Security Board, as well as the other State and Federal agencies which are concerned in the program, has devoted much attention to this question of the data which are essential for successful administration of the law.

There are certain general principles which must govern work in this field. The first of these principles is that statistics may and do serve as a guide both to short-run administrative performance and to long-range policy making. Both are needed in the proper balance in any security program, although the proportion may differ from time to time as the program develops.

An administrator must emphasize two facts: (1) that the same statistical data frequently serve both administrative and research purposes, and (2) that research seldom requires a large volume of statistical data to provide answers to questions of policy. If the collection of certain data is justifiable on administrative grounds, there certainly can be no basis for criticism in the fact that the same data may also serve long-range research purposes.

A second general principle is that the data essential for administration must be governed in part by the character of the law to be administered. For example, the information required for old-age benefits and unemployment compensation is not always identical. Every effort will be directed toward simplification and unification; but the fact remains that the administration of unemployment compensation necessarily differs widely from the administration of old-age benefits, and the requirements of the two systems naturally differ.

A third general principle is that the data which are essential to efficient administration are necessarily determined by the nature of the administrative organization established by law. The administrative organization and the procedures which are necessary under it are in

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large measure already determined for the administrator when he begins his work. Thus, the Congress of the United States decided that unemployment compensation should be administered in this country on a Federal-State cooperative basis, but that old-age benefits should be established on a strictly Federal basis. In such an administrative structure certain types of data are required which would not be so necessary in some other form of administration. For example, some knowledge on the nature and extent of interstate migration of labor is absolutely necessary for unemployment compensation, though for old-age benefits no such problem arises.

ADMINISTRATIVE REQUIREMENTS

What are some of the specific problems which are facing social security administrators at the present time? The first item on the list relates to contributions. The Federal tax on employers of eight or more, which constitutes the basis for State unemployment compensation acts through a system of tax offsets, is already in effect this year. The employer and employee taxes covering the costs of old-age benefits, began on January 1, 1937. In both cases the following would seem to be the very minimum data which must be obtained:

a. The coverage—number of employers, the number of establishments, and the number of employees therein.
b. The amount of taxable wages paid by these employers to these employees.
c. The taxes paid by employers and (if any) by employees.

These items of information are needed at frequent intervals (monthly or quarterly) by individual employers, by major industry groups, and by place of employment—by States and by major areas within the State. The need for these data is not based upon any abstract or long-range research program; these elementary facts form the basis for immediate administrative decisions.

There are complications in obtaining even these apparently simple items. The coverage of the Federal employer tax may not be the same as that of a State; the definitions of wages may not be identical. The coverage in old-age benefits is wider than in unemployment compensation. These facts make it all the more important that precise and accurate data should be available for each class of coverage.

A second item of equal importance, though not immediately so pressing, is that of benefits. There is a period of two years after taxes begin before unemployment compensation benefits can be paid. Under the Federal old-age benefits plan, monthly benefits are not payable for

five years, although death and retirement benefits are payable immediately. In both cases the wages which constitute the basis of ultimate benefit payments must be taken into account almost immediately, because when claims are later presented it will be necessary to have available all the facts which are required to determine the amount of the benefits which are due.

At the present time a debate is being waged concerning the respective merits of requiring current detailed payroll reports and requiring separations reports only. The detailed payroll report system is much to be preferred for research purposes, but the final decision must necessarily be based upon administrative grounds, particularly the effect upon claims procedure. The goal must be the prompt payment of benefits, and whichever system best serves that purpose is the one which should be adopted. It may be that a combined system will prove most practicable.

A third item which may be mentioned briefly is that relating to placements. With large numbers of unemployed workers passing through the compensation commissions' organization regularly, it will be important to extract from the records data relative to registrations, interviews, referrals and character of placements.

LONG-RANGE RESEARCH

There are at least two major problems which have much more than short-run administrative implications. One is the problem of merit-rating in unemployment compensation. Both the Federal and the State acts require a period of experience before merit-rating can be instituted. During this period some study of the problem will be necessary, sometimes in order to determine what the merit-rating system shall be, in other cases to determine whether the system written into the law will need to be modified. This is an intensely practical question, although it may properly be considered under the head of long-range research because of the time element involved. Three years from now it will begin to be an immediate administrative problem.

The second major question is the problem of solvency—the long-run balance between the amounts paid in benefits and the amounts available in the compensation funds. In unemployment compensation it will be necessary to determine State by State whether the compensation fund will be adequate to meet the schedules of benefits which have been established.

What can the administrator do? He must insist upon having available for his use such data as can be collected upon the incidence of unemployment and its duration, case by case, industry by industry,

employer by employer. The unemployed will have to be classified by age and sex; the nature of part-time will have to be clearly defined and recorded. It should be clear then that administrators must necessarily require statistical data which will answer these questions concerning unemployment. It is not only possible but desirable that such data be secured as a part of the ordinary routine operation of the program.

COORDINATION AND SIMPLIFICATION

Despite the urgent necessity for data in the administration of the social security program, a most rigid inspection will be maintained on the data actually requested. Every effort will be made to coordinate the data collected so that duplication can be avoided.

There are three points to be considered in such a program of simplification. In the first place, it can be achieved only within the limits of the laws which must be administered. Insofar as an administrator finds his program defined for him, he must adapt his data requirements to the necessities of the case.

Secondly, many employers must necessarily consider the adaptations of their records to the needs of social security. Some employers keep adequate records for this purpose and will not need to make any change in their record-keeping system. Other employers have a system which is not readily usable, and these may have to make some readjustment. Some employers apparently keep no records at all, and these will have to institute some kind of a record system. It is my conviction that the reports required by the social security program are not such as to constitute an undue burden on employers who maintain records adequate for their own business purposes.

Third and last, it is important to note that this program is still in a formative stage. Different bases of benefit computation have been instituted in different States. Some of these involve fewer and simpler records than the others. Administrative experience will finally work out that system which best combines administrative efficiency with reasonable cost. During this period it is essential that the administrators and employers cooperate closely so that the needs of the former and the convenience of the latter are both taken into consideration. The Social Security Board will do its utmost to cooperate with State administrative agencies and other Federal administrative agencies with these two paramount objectives in view: First, to reduce to the minimum the number of reports and content of reports required; and second, to increase to the maximum the effectiveness of the analysis and presentation of the data contained in such reports.

MINIMUM STATISTICAL REQUIREMENTS FOR EFFICIENT ADMINISTRATION OF UNEMPLOYMENT COMPENSATION SYSTEMS*

By George E. Bigge
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In discussing minimum statistical requirements for the efficient administration of the Social Security program I shall confine myself largely to the requirements of the Unemployment Compensation systems, without much reference to the Placement Service, or to Old Age Benefits, or other provisions of the Social Security Act. No one will deny that many of these problems are closely related. They deal, in the main, with the same people, and the same relationships: employment, unemployment and under-employment; jobs, wages, and insecurity, and the like. Yet no one will insist that all of the facts and data are equally important in dealing with the several aspects of the larger problems.

Moreover, some data are for general purposes only, for determination of policy, and not for administration. For example in the administration of Unemployment Compensation and Old Age Benefits, we have to do with contractual obligations to individual workers. To meet these obligations properly, we need a record of employment and earnings of each individual over a period of years. For administrative efficiency the reports and records involved here should be of such nature as to be easily verified, readily available for information on request, and should lend themselves to the determination of eligibility, and of benefits, without delay. Obviously these criteria would be of relatively little importance in judging a similar system of records from the point of view of policy determination.

In limiting my discussion to Unemployment Compensation, I am not ignoring the importance of these other aspects of the program. In the long run, it is undoubtedly more important to place an unemployed man in a new job, than to pay him benefits, however efficiently that may be done. Since this is true, the community will find a way to get the proper information on which to base a sound employment policy. Nevertheless, it seems clear that the types of information required for these two lines of attack upon the same problem, are sufficiently different to be considered separately; and I am leaving aside for the present, the needs of the policy-making functions or agencies.

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The administrative requirements for Old Age Benefits, once the registration has been completed, are sufficiently simple to fit into the minimum requirements for Unemployment Compensation. True, the coverage is not the same and adjustments will doubtless be made in this respect, but the *type* of current information required for the latter is sufficient for the former also. I shall therefore limit myself, as indicated, to the requirements of the Unemployment Compensation program.

One of the greatest difficulties encountered in a discussion of this subject is that the administration of Unemployment Compensation is in the hands of the several states. Although the standards prescribed by the Social Security Act induce a certain amount of uniformity in the various state schemes, still each state act, in its provision for the determination of eligibility, or of benefits, lays down certain requirements which condition the administrative procedure which can, in practice, be adopted. None of these requirements however, unless it be that with reference to merit rating, can be said to affect the basic purposes of the program. And I assume we are interested here in what data *should be* required to make such a program workable; not in what *is* required by specific laws now in effect. I shall therefore in the main ignore the details of the several state laws, and consider the question from this more general point of view.

In formulating the specific requirements of such a program we must keep in mind the fact that in this social security legislation we are dealing with a larger number of people in a more intimate way, than in any other legislation we have ever attempted. This is particularly true where there are contributions from employees as well as from employers. The income tax affects only a fraction of the number of people who pay the security taxes; and most of the other forms of taxation and regulation are so well hidden that the citizen is quite unconscious of what is happening to him. But here we face him with the facts every time he pays, or receives wages. As someone has well expressed it, this is a major problem in public relations, as well as a problem of taxation and disbursement. The good will of the people with whom we deal is essential if the program is to work effectively. For this reason I suggest that any procedure adopted should bear as lightly as possible upon the employer; and should assure the worker of fair treatment.

One of the first things done by the state board with which it was my good fortune to be connected was to assure employers that no unnecessary data would be required, and to invite them to cooperate with the Board in devising the simplest adequate procedure. The response was most gratifying and continues to bear fruit. The official in charge of

Old Age Benefits registration tells me that, due to the cooperative attitude of employers—which he attributes largely to the earlier experience with Unemployment Compensation—he had turned in, at an early date, 102 per cent of the registrations expected in the state.

A second point on which I imagine all can agree, is that in judging the efficiency of any system we should count the whole cost of recording and reporting data; to the employer as well as to the state agency. This may appear self-evident, but I fear it is frequently overlooked in comparing the costs of operation of various plans. Obviously, any attempt to make cost comparisons between a state which requires all relevant information to be sent to the state agency, all records being kept and all computations made there; and that of another state operating on a system of separation reports, where the employer keeps all current information in his files, and transmits a copy of it only periodically, or when a worker leaves his employment; would be entirely unfair if it failed to take account of the employer's expense in this connection.

Also, in judging the efficiency of any system we must keep in mind not only present costs but long-run needs. We have all had experience with policies which were "penny wise, and pound foolish" in this respect. The purpose of all of our security programs, except for the element of prevention which appears in some, is the prompt and fair payment of the correct amount of benefits to eligible workers. Clearly a system which is altogether satisfactory for the purpose of collecting contributions, may be entirely inadequate for the purpose of determining eligibility for benefits, or for computing the amount of benefits due in any case.

For example, let us assume that a state is operating with only separation reports, all detailed information for employed workers being in the hands of the employer. At the moment, and while no benefits are being paid, this is much more economical both for the state and for the employer than a system calling for periodical detailed payroll reports. But when we consider the high rate of labor turnover in American industry, and remember that when a man leaves his job the employer must under most such schemes send his employment record to the state agency, it appears that in the course of time the employer, on the whole, will report about the same information under either system. Many workers, especially in irregular industries, will have a number of such reports, from different employers, in a single year. And the state will have to file these reports, which will doubtless prove much more bulky than individual ledgers. Furthermore, when benefits are to be paid, these reports must be utilized either to compute the benefits pay-

able, or to check the employer's computation. I venture to suggest that if both employers' expenses, and those of the state are taken into account, over a period of years, the system requiring current reporting of payroll information will be found the more efficient in meeting the needs of *existing* laws, in most states.

Most of the inclination toward employers' record-keeping in preference to state record-keeping, I believe, derives from looking at the problem from the point of view of employers' reserve funds, rather than that of the pooled fund. The former leads one to think of the employer as insuring his own workers against unemployment, in which case he naturally would keep the necessary records. The state would act only as auditor, or perhaps custodian of the funds and see that the employer treats the workers properly. In case of the pooled fund the state undertakes to provide a measure of security against the hazards of unemployment, and calls upon employers and workers to make such contributions and give such cooperation as may be necessary to accomplish its purpose. The former aims chiefly at preventing unemployment, the latter at assisting the unemployed. There can be no question that prevention of unemployment is by far the more desirable end, but it is by no means clear that it can be achieved by this method. And since this is the case it will be well to recognize throughout, the additional burden of records to which the whole system is subjected in attempting to apply this particular policy.

The same reasoning applies to the merit rating provisions written into many of our state acts; that is, the proposal to adjust the contribution for each employer according to his employment record. While this may or may not lead to additional record-keeping by employers, it does require a kind and amount of detail in the records kept by state agencies which is not necessary where merit rating is not contemplated. In considering minimum requirements, I suggest that we stop for a moment to examine the underlying notion of the merit rating proposal, to see whether it is worth the effort involved in making it effective.

The proposal as suggested above, rests upon the assumption that an employer can reduce unemployment among his workers if he will try. The variation in the premium rate is to stimulate him to do this. But also, it would seem to assume that wherever employment *is* more regular it is due to the employer's efforts. This, of course, is by no means the case. If there is less unemployment in newspaper publishing, or in the telephone industry, than in building or coal mining, it is due very largely to external factors over which the employer has little or no control. In a system of social insurance there is no good reason for reducing the tax on those on whom the burden of unemployment falls

least heavily. If the premium is to be adjusted to the unemployment record of the individual employer, justice would seem to require that his experience be compared with that of others in the same industry; a building contractor with others in his line, a newspaper publisher with other publishers, etc., and not with the average for all industry.

In this connection it may be well to digress long enough to point out that we are too much inclined to think of Unemployment Compensation in terms of our experience with Workmen's Compensation. Workmen's Compensation laws tended to prevent or reduce accidents, why should not Unemployment Compensation prevent unemployment! But the problem of accidents and that of unemployment are basically different. The problem of accidents relates to production and is, therefore, to a large extent, under control of the producer, or employer. The problem of unemployment, on the other hand is a phenomenon of the market, and is related more directly to consumption. Over many factors affecting unemployment the individual employer has little or no control. If employers are to attack this problem effectively, it must be done by concerted action. And this is in line with the idea of a pooled fund, not of individual employer's reserves.

This is not to say that individual employers can do nothing to regularize employment. There is ample experience to prove that good management can do much to eliminate or neutralize seasonal and other short time fluctuations in employment. But it has yet to be shown that the small savings in premiums which can be achieved by regular operation is likely to be sufficient to induce regularization by employers who would not otherwise have done so. Certainly the experience in the Chicago clothing market is by no means convincing.

Perhaps we shall find it worth while to consider the experience of England in this connection. The English began by allowing certain industries to "contract out" of the insurance scheme. Presently, however, this was abolished, and after twenty years of experience we find the opposite suggestion coming to the fore. The more recent proposal is to separate out certain industries which are notoriously *irregular*, and accord them special treatment in the sense that they may be required to observe much more stringent rules, must engage all labor through the public employment agencies, and the like. This "scheduling," rather than merit rating has not been carried out to any great extent, but it would seem to be far more equitable, and probably more effective in dealing with unemployment, than the granting of special favors to those already favored by existing conditions. And it is on the basis of its effectiveness in preventing unemployment that the merit rating principle must rest; to say that it is *unfair* to make employers and em-

ployees in regular industries contribute for the benefit of workers in irregular industries, is to overlook the nature of social insurance.

I would suggest, therefore, that the principle of merit rating, and the variation of contribution rates in accordance with such rating is unsound and might well be abandoned. In its place I would suggest "scheduling" those industries which are particularly irregular in operation, and requiring them to make such reports and follow such procedures as seem necessary for effectively dealing with their problems. They may well be set up as a separate group required to pay higher contributions and submit to other special regulations. But this would apply to a relatively small portion of the whole field, and would relieve the Boards of the necessity of setting up the general record system to carry back each worker's record of employment and unemployment to the account of individual employers over a period of years, as is necessitated by the merit rating provisions.

The community would still want to know the facts regarding the variation of employment between other industries, the fluctuation in employment, etc. The question then arises whether in setting up our Unemployment Compensation records and reports we should limit ourselves to what is necessary for efficient administration of the contribution and benefit provisions of such a program; or whether we should use these as a convenient vehicle for gathering various sorts of information which will enable us to deal more intelligently with the problems of unemployment, under-employment, wages, hours, placement, and the like. It has been my contention throughout that even when reduced to its simplest terms, the problem of contributions and benefits is so enormous that we should not complicate it by unessential additions, however significant these may be in themselves. If it seems desirable from time to time to get additional information for the determination of policy, this can be done by calling for special reports, not as part of the unemployment compensation reports, but supplementary to them.

These observations regarding the general problems involved, lead me to the following conclusions:

1. We should require, currently, only such reports as are essential to the effective administration of the system of unemployment compensation itself, and not try to make them serve other general purposes of a statistical nature. Certain statistical studies can be undertaken on the basis of information that will be available in any case, but no special information should be included in the compensation records solely for statistical purposes.

2. Systems of "Employers' Reserves," or "Merit Ratings" systems require special records. The chief justification for such systems is that they tend to reduce unemployment. Their efficacy in this respect is open to question and since the purpose can be accomplished, better perhaps, by special attention to the *irregular* industries, we should consider requirements for other purposes, and judge the merit rating elements separately in terms of added costs.
3. In counting costs we should consider *all* costs, to the employer as well as to the state; and over a period of years, not only in the initial period.
4. If this is done, most of the advantages of the separation report system which leaves the basic information in the hands of the employer, except at the termination of employment, will disappear, and it will be found no more burdensome to report essential information periodically to the State agency. Incidentally, such centralized record-keeping is desirable as a matter of convenience, to guard against possible loss of records, and as protection, by a responsible public authority, of the workers' interest in the program.

The reason we have shrunk from this conclusion, I think, is because of the staggering burden of records and reports involved. But if we admit the conclusion, perhaps we can find a better solution for the problem than merely ignoring it, or postponing the burden to the future. The basic information necessary for effective administration depends upon the conditions of eligibility, and the method of computing benefits. Most state acts base eligibility on past weeks of employment, and benefits on average, or full-time, or normal weekly earnings, with certain minimum and maximum limits. Most of the acts also provide for merit ratings, or at least require records to be kept for the study of merit rating.

Some months ago after prolonged discussion, it was agreed by a committee of the interstate conference that, under these conditions, efficient administration required the current reporting of persons employed, hours worked, and wages paid, by establishment. Nothing less seemed adequate. The officials of the various states, and of the Social Security Board, and representatives of employers and various business services attacked the problem of providing this information in the simplest form. I recall our first session in Rhode Island with the representative of a certain business machine concern. The procedure then suggested would have involved a staggering burden of reporting, tran-

scribing and filing. In a few weeks we had devised special forms which reduced the burden enormously. Others made similar progress so that the problem, while still a stupendous one, has already been reduced to manageable proportions.

But this was only the beginning. Within the last few weeks suggestions have been made for modification of the state laws so that *earnings*, rather than hours or weeks of employment shall be the basis for determining both eligibility for benefits, and amount of benefits. This, it seems to me, from the point of view of simplification of procedures, is the most important advance made since the beginning of our discussion of Unemployment Compensation. Also, it is directly in line with the observations made earlier in this discussion. It makes possible the elimination from the reports of all but the most essential information. The hours or weeks of employment, over-time, short-time, and the like, are interesting facts, but not essential to the fair determination of eligibility, or of benefits.

Briefly, the proposal is that a person shall be eligible for benefits if he has earned, in a certain period of time, say a year, a certain specified minimum amount, or a certain multiple of the amount he will receive as weekly benefit. In other words, he becomes eligible on the basis of what he *earns*, not the *length of time* he works. Benefits, under the proposed scheme, would also be based on *quarterly* earnings, over a period of time, and limited to a certain relationship to total earnings.

Such a scheme has much to recommend it. In the first place it lends itself to more accurate computation of the probable claims, than a scheme which relates contributions to earnings, and benefits to weeks of employment. In the second place it eliminates the necessity for including in the employers' regular Unemployment Compensation reports, and in the records of the Boards, the hours of work, and weeks of employment. It will make it possible for the employer to report monthly on *total* payrolls only, and quarterly, instead of weekly, on the earnings of each person on the payroll. Also, it will eliminate a very cumbersome process of computing benefits, and remove altogether the problem of properly defining a "week of employment" as a basis for determining eligibility for benefits. All things considered, it will reduce the reports of employers and the records of state commissions to a fraction of what is essential under existing requirements.

And it sacrifices nothing from the point of view of the insured worker. We have investigated it from various angles, and so far we have found no essential and significant difference in the results of the two systems, except that the irregularly employed worker who earns good

wages when he works, will qualify for benefits on a basis of earnings much more easily than on a time basis.

If, then, we are searching for the minimum statistical requirements for effectively carrying out the major purposes of the social security program as this relates to unemployment, I suggest that we may well adopt the proposals now being made by the Social Security Board. As indicated, these would require of employers only a report of total payrolls once each month, and a quarterly report giving names of employees and earnings for the quarter. The state agency, likewise, would keep its records in terms of earnings by quarters. Benefits also would be computed on the basis of quarterly earnings and total earnings. This may not be reaching the goal of minimum requirements at a single bound, but it is undoubtedly a long step in that direction.

It should, perhaps, be mentioned again in closing that this is not a contention that we can deal with the problem of unemployment, merely on the basis of the information indicated. Unemployment Compensation is only a small part of any adequate program directed toward this end. Detailed information must be available in the employers' records. Undoubtedly this will mean some additional record-keeping by employers who have been negligent in this respect in the past. This should be required of all employers, not only of those who employ eight, or four, or whatever number is taken as the minimum for coverage under the state Unemployment Compensation act. A report of this information may be called for as needed, or may be required periodically if this seems desirable. This may be done by the same agency which administers unemployment insurance, or compensation, or by some other agency. The point I wish to stress in this discussion, is that the two functions should be considered separately, at least when we are discussing *minimum* requirements.

THE EMPLOYER'S PROBLEM IN SOCIAL SECURITY REPORTING*

By Christian E. Jarchow, *Comptroller*
International Harvester Company

The social security board has already registered about 45,000 employes of the International Harvester Company for participation in the benefits of the old age security plan. As we have an integrated business, our employes are engaged in a wide range of jobs. Our problems in connection with social security are, therefore, more complex than those of concerns which operate in a limited territory.

Recognizing at the outset the broad scope of the subject, we appointed a special inter-departmental committee made up of representatives of the following departments: Law, Manufacturing, Industrial Relations, Sales, Statistical, and Accounting. This committee considers all Federal and State social security legislation affecting the Company and its affiliates; develops plans for handling pertinent matters requiring attention; and advises and assists all persons in the general office, factories, sales branches, and other offices in complying with requirements of these laws.

Department heads are relieved as far as possible of these matters except on questions of policy and final approval of instructions.

Briefly, the general procedure is as follows:

(1) All social security legislation, including State unemployment laws, is analyzed by committee and copies of analyses are sent to interested department heads and to all operations affected thereby.

(2) Statistical information and reports requested by Federal government and states are cleared by committee before being filed.

(3) All tax returns, both Federal and State, are prepared and filed by general office from information furnished by factories, sales branches and other points of operation.

(4) Accounting Department issues full instructions to all operations in Company concerning proper method of handling the taxing or contribution provisions of Federal and State laws and sends out information relating to records and reports.

(5) The tax is paid by general office and absorbed by the respective operations as an item of cost.

* A paper presented at a joint meeting of The American Statistical Association and American Association for Labor Legislation, Chicago, December 28, 1936.

Statistical requirements under the social security programs, generally speaking, comprise the following: Filing original applications of employer and employes; computing deductions from wages and payments to Federal and State governments; preparing periodical reports by Federal and State bureaus; and keeping permanent records by employers.

Filing of applications by employer and employes is completed at this time. Many employes have received their account numbers from the Federal government and presumably most of them will have been issued by January. The employer is charged with responsibility of ascertaining and recording account numbers of all employes. If an employe has not filed his application by June 30, 1937, the employer must do so. When new employes are hired hereafter, it will be necessary for employer to file an application form SS-5, unless such new employe has previously done so—in which case his account number must be ascertained and recorded.

Many companies find it necessary to change their employment records as a result of employes not using their legal names. Numerous employes have requested that their age be changed on the employment records to conform with that reported to the government.

Generally speaking, compliance with Federal and State social security laws will not necessitate setting up new or special records. Our current records with some modifications will provide the information required under these laws. The records are as follows:

(1) *Employes' Record Cards of Service and Earnings.* The cards will show employe's Federal Social Security account number, State number, if any, wages and all other details required under Federal and State social security legislation. They will be kept at each of the various operations.
Since only the first $3,000 of an employe's earnings from one employer during any calendar year is subject to tax, earnings must be accumulated on employes' earnings cards. Such record is also necessary in determining unemployment taxes under certain State laws.

(2) *Pay Rolls.* These forms are being revised and, in addition to customary pay roll information, will show Federal account number for each employe, period of service covered by each payment and amount of employe's tax and other deductions withheld or collected with respect to such payment.
Regulations require employer to furnish employe statement of tax withheld from his wages. This may be shown on pay en-

velopes or pay roll checks or by supplying special statement to employe showing deduction made.

(3) *Monthly Reports from factories, sales branches and other locations for Federal Old Age Benefit Taxes.* These reports will be required beginning January, 1937, to show total wages, wages exempt from tax, amount of tax withheld from earnings of employes, and employer's tax. Tax of employer and employe to be paid to Collector of Internal Revenue each month. The law requires that all operations of one company be consolidated in one return and filed with Collector of Internal Revenue in district in which principal office is located. Two or more affiliated companies cannot consolidate their returns.

(4) *Monthly Reports from factories, sales branches and other locations for Federal and State Unemployment Insurance Tax.* These statements show gross wages, gross Federal tax, credit for State tax, if any, to apply against Federal tax, gross State tax, if any, and net amount of Federal Tax. These reports also list required employment statistics. At some points of operation, particularly sales branches which have territory in two or more States, the information is reported separately for each State.

(5) *Quarterly Reports from factories, sales branches and other locations for filing information returns under Federal Old Age Benefit Plan.* First reports will cover period January 1st to June 30th, 1937, and subsequent reports will be submitted quarterly. In view of the large number of employes and the fact that an individual information return will be required for each employe, we shall distribute the work of preparation to each point of operation.

Old Age Benefit taxes are based on first $3,000 of wages earned from each employer in each calendar year. That is, if an employe has more than one employer in a calendar year, first $3,000 of wages earned from each employer is subject to tax imposed on both employer and employe.

Unemployment insurance laws have been enacted in 29 states, including District of Columbia (up to December 24, 1936). Federal unemployment tax applies to pay roll in all States—even though a State may not have an unemployment insurance law.

The return for the year 1936 is due January 31, 1937. The tax, however, may be paid in quarterly installments on January 31st, April 30th, July 31st, and October 31st. Each company may take as a credit

(not to exceed 90 per cent of Federal tax) against the tax accumulated amount of contributions paid by it to States having unemployment insurance laws approved by the Social Security Board. All State unemployment compensation laws, except some of the most recent ones, have been approved by the Federal Board.

There is lack of uniformity in statistical information and tax returns required under the various State unemployment insurance laws. This is troublesome to an employer operating in more than one State and particularly to those companies having employes in many States. Presumably, as time goes on, an attempt will be made for greater uniformity among the States.

An additional problem to the employer is the modification of Industrial Relations plans which overlap benefits provided in the Social Security Act, especially in the case of those companies having pension plans. To avoid the assumption of a double liability with respect to the cost of future pensions, these companies must terminate existing plans or modify them in such a way as to supplement the benefits obtainable under the Social Security Act.

STATISTICAL REQUIREMENTS OF SOCIAL SECURITY PROGRAMS*

Discussion

In view of the fact that the combined State and Federal Social Security laws represent a stupendous undertaking in their application, it is urged that every effort be made to keep the laws as simple as possible, even to the point of being arbitrary for the present, so as to minimize the number of items that have to be reported by employers and posted and recorded by the State and Federal administrative bodies. Laws along the type of the Connecticut and Michigan unemployment laws are far superior in this regard to those of the New York and Wisconsin Type, because the Connecticut and Michigan laws utilize the Old Age Benefit Reporting System as the basis upon which the State Unemployment Compensation law is developed.

It may be objected that simplicity in reporting may interfere with research progress. It is urged, however, that at the present time all necessary research can be done on a sample basis only, with the cooperation of employers voluntarily. Most employers will be glad to cooperate in any constructive studies and there should be no difficulty in any State getting the cooperation of a sufficient number of employers for such studies.

It is also urged that the problem of classifying employers and labor should be carefully studied for a long while before any decisions are made on the classifications to be used.

There are four ways of classifying an employer's business—first, by the processes he employs; second, by the raw materials he uses; third, by the products he produces according to trade names or, fourth, according to the trade channels in which he operates. Thus the problem of classification is a multiple and not a simple one and any arbitrary distinctions which disregard these generic or functional classifications of economic activity are bound to result in invalidity of data, with gross inaccuracies which exist in the Census of Manufacturers.

Professor Bigge expressed a belief that merit rating is too complicated to become practical because of the statistical work involved and, furthermore, expressed a belief that it will fail of its purpose, namely, to furnish an incentive for employers to do what they can to stabilize their employment. I strongly dissent with this position. In the first place, it is possible to set up merit rating systems so that they are simple from a statistical point of view. In the Michigan law, we have eliminated most of the statistical complications in merit rating by providing that an employe's benefits shall be charged against the account of the last employer, thus eliminating charge-backs to prior employers. This is sound in principle because once an employe has left the employment of a given employer and has obtained employment with

* The three papers preceding and the discussions that follow were presented at a session on this subject at the Ninety-eighth Annual Meeting (in joint session with the American Association for Labor Legislation).

another employer, there is no reason why the merit rating of his prior employer should be affected one way or the other by subsequent unemployment. In the second place, the only defense for payroll taxes basically is to make the cost of unemployment compensation an industrial cost and, therefore, a part of the price system so that the price of the product will consist of varying charges, depending upon the unemployment experience of the firm or industry manufacturing that product. The prices of houses and automobiles must contain a sufficient element of such costs for unemployment compensation purposes so that the public whose buying habits produce the wide cyclical fluctuations in these industries will pay for the burden which this places upon the community. On no other basis can payroll taxes be justified. If the contrary view is taken that nothing can be done about the problem of unemployment (in spite of the fact that many concerns and some industries have shown that a lot can be done about it) and thus that unemployment is simply a residual social cost, then under no circumstances are payroll taxes justified for financing unemployment relief but, on the contrary, such relief should be financed solely by graduated individual income taxation. Without merit rating, therefore, the whole theory of payroll taxes to support unemployment compensation breaks down. Merit rating grants no favors to any employer. It simply provides that the taxes will be somewhat in proportion to the risk exactly in the same way that is done in determining fire insurance rates by cities and types of dwellings.

With merit rating simplified statistically, there remains no reason why it cannot be made effective and furnish a strong inducement to the individual employer to do his best to improve the unemployment experience of his own employes.

Stephen M. DuBrul

General Motors Corporation

Discussion

The research aspects of the statistical data required in social security may be summarized briefly under three main heads: First, the basic data must necessarily be governed in large measure by administrative considerations. Research needs must be kept in mind and must be met within reasonable limits. On the other hand, success of the program which has actually been established may depend to a considerable extent upon simplicity of administration. Therefore, research workers must be content to remain in the background, adapting their needs to the possibilities that may remain open after major administrative problems have been met.

Secondly, however, there is need for emphasis on the fact that statistics cannot always be obtained as a by-product of accounting—in other words, as a by-product of the administrative process. To the extent that such a relationship can be established, the research worker may find materials ready-made for him; but there cannot be complete reliance on this source, for there are certain types of data which must be obtained from the outside if intelligent appraisal of administrative policy is to be made.

Thirdly, a comprehensive research program must be built upon a combination of sources of data. Within the Social Security Board, for example, the following three types of data are being developed: (a) current reports on a regular monthly basis—for major items such as number of employees, amount of payroll, kind of industry, and place of employment; (b) periodic reports at intervals of six months or a year—for subsidiary items such as classification of employees by age, sex, or individual earnings; and (c) special reports on a sample basis—for such data as length of unemployment, amounts of individual benefits, or shifts of workers from place to place and industry to industry.

Current reports should come through the accounting process, and statistical methods are being devised which will yield current data with a minimum of extra time and money. Periodic reports should flow largely from accounting procedure, but special tabulations and year-end summations will always be necessary in addition. Special studies, which are the most costly of all and the least adaptable to the routine of administration, frequently constitute the heart of a research program. Since speed and flexibility are essential if such studies are to serve administrators as guides to policy, the sampling technique has to be widely used. The possibilities of such a technique have already been explored in other fields by research workers. In the Social Security Board research program a further extension of such methods will be attempted.

EWAN CLAGUE

Bureau of Research and Statistics
Social Security Board

ANALYZING FAMILIES BY COMPOSITION TYPE WITH RESPECT TO CONSUMPTION*

By Day Monroe
Bureau of Home Economics
U. S. Department of Agriculture

THE CURRENT Study of Consumer Purchases[1] was planned primarily to furnish basic data concerning the consumption patterns of families of the United States. A family's consumption is affected both by its income and by the number of persons for whom the income must provide; hence classification by family composition has been part of the plans from the inception of the project.

In the collection of expenditure schedules, the controlled sample has been restricted to seven family types, as follows:

1. Husband and wife, and no other persons
2. Husband, wife, 1 child under 16, and no others
3. Husband, wife, 2 children under 16, and no others
4. Husband, wife, 1 person 16 or over, and one or no other persons
5. Husband, wife, one child under 16, one person 16 or over, and one or two other persons regardless of age
6. Husband, wife, 3 or 4 children under 16, and no others
7. Husband, wife, at least one child under 16, and 4 or 5 other persons regardless of age.

These types are used as units for the analysis of data relating both to income and to consumption. Number and (to a limited extent) age of persons in the economic family are the basis for these types. Each represents a somewhat homogeneous group within which considerable variation is possible. Since these seven types represent approximately 96 per cent of the native white families in the random sample taken in small cities and villages and 93 per cent of the random farm sample, they are representative of the great majority of the nation's families. It is obvious, too, that any scheme for classifying so large a number of families in only seven groups must admit of some variation within each group.

From the standpoint of methodology of consumption studies the following questions should be considered:

* A paper presented at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, Illinois, December 30, 1936.

[1] Plans for analysing families by types, discussed in this paper, represent the work of the four Federal agencies cooperating on this project: The National Resources Committee; the Bureau of Home Economics, of the U. S. Department of Agriculture; the Bureau of Labor Statistics, of the U. S. Department of Labor; the Works Progress Administration; and the Central Statistical Board.

Of what value is classification of families by composition type in analyzing consumption data?

What are the alternatives to this method of classification?

Upon what basis were these specific family types chosen? What are their merits? Their shortcomings?

Does experience, to date, indicate that use of these specific types in future studies is desirable?

The classification of families by composition type adds significance to any analysis of consumption by income. Everyone familiar with expenditure studies where all families have been grouped together by income, regardless of family composition, would agree that attempts to interpret findings were highly unsatisfactory. Two families, one of two members and one of seven, each with an income of one thousand dollars, cannot be considered as living at the same economic level. Classification by type permits analysis of variations in expenditure patterns of families of different types, when income, occupational group, degree of urbanization and area are the same. This scheme of classification also enables the investigator to hold the factor of family composition fairly constant, and thus obtain increased clarity in observations of variations in family expenditure patterns with variations in other factors, such as socio-economic status or residence in city or village.

Granting these values of classification of families by type, one may ask whether this method is preferable to other possible methods of differentiating families according to composition. The most important of such other possibilities are: Classification by number in family, regardless of age; by income or expense per consumption unit; by per capita income or expense (a method closely related to the preceding but less exact); by stages of the family life cycle.

Classification by number in the family is far better than no classification. In some previous studies where selection of families has been rigidly limited (as to those having children under 16 and none older), classification by size automatically provides types. In this project where there has been less limitation of family composition in order to obtain a more representative sample of the population, classification by number of family members regardless of age seemed inadequate.

The next alternative is determining family size in terms of "consumption units" of some sort and classification by expense per unit. These units, supposedly, stand in the same relation to one another as does the consumption of the different family members. The use of units for analysis of family expenditure data was initiated by Engel. His unit, the quet, was based upon the assumption that the expense incurred for the child from the time of its birth to manhood increased by approxi-

mately the same amount each year. According to his scale, the new born babe was equivalent to 1.0 consumption (cost) unit; the man 25 years of age, to 3.5 units. Subsequent research workers have formulated other scales, most of which have used the consumption of the adult male (rather than that of the infant) as the unit.

Among earlier investigators, there was some confusion between scales based upon relative expenditures for individuals, consumption (cost) scales, and those based upon bodily needs, such as nutrition requirements of persons of different age and sex, consumption (nutrition) scales. Now, however, cost-consumption scales are recognized tools for analysis of family expenditure data.

Cost-consumption scales for analysis of expenditures for items of family living consumed individually (as food and clothing) are more successful than those for analysis of housing and other goods consumed on a family basis. A composite cost-consumption scale for all goods and services, based upon relative expenditures for the food and clothing of family members and upon per capita expenditures for other items, has been formulated and is being used by Dr. Faith M. Williams in analyzing money disbursements of wage-earners and clerical workers.[2] Classification of families according to expense per consumption unit (as determined by this scale) represents a great advance over classification by per capita expense since it takes account of differences in costs of food and clothing with differences in sex and age. Such a method of classification is well adapted to the main purpose of the investigation for which it was used—the revision of the cost-of-living indexes of the Bureau of Labor Statistics.

For the present Study of Consumer Purchases whose primary purpose is to depict the consumption patterns of the population, the use of a cost-consumption scale seems less well adapted. Presentation of data concerning *family* consumption of housing, radios, and many other goods and services is a more realistic method of showing the consumption patterns within a farm area, or a city than is presentation of data by "equivalent adult males." Estimates of community consumption can be made by weighting the data from families of specific types according to their frequency in the community. Furthermore, the family schedules used for this study furnish important information concerning family income, number of earners per family, their age and their earnings, and the burden of family support—all of which must be analyzed on a family basis to be of maximum value.

However, the use of family types as a basis for analysis of consump-

[2] Faith M. Williams, "Money disbursements of wage earners and clerical workers in 11 New Hampshire communities." *Monthly Labor Review*, March 1936, Vol. 42, pp. 554–563.

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However, the use of family types as a basis for analysis of consump-

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tion data does not preclude the concurrent use of cost-consumption scales. Such scales will be used in our analysis of expense for food and clothing. Thus, figures showing annual expense for food for a family of given type, income level, and occupational group will be accompanied by figures for expense per meal per food-cost-unit for the same family. It seems possible, by such a combination, to utilize the advantages and minimize the disadvantages of the two methods of classification.

Classification of families by stage of their life cycle must be accompanied by some classification by size, to obtain a clear-cut analysis of family consumption. This then becomes a sort of classification by type, once stages are defined in terms of ages of children and parents. Family types 2, 3, and 6 of this project[3] are clearly in the early and middle stages of their life cycle. However, families of types 1 and 4 may be in any stage; the third adult in the latter type may be the parent of a young husband and wife or may be the grown son of an elderly couple. A further break-down of the family types used would be highly desirable, not only to shed more light upon changes in consumption with changes in the family life cycle, but also for many other purposes. However, limitations of time and money made limitation to seven types imperative for sample control and preliminary analysis. Further break-downs may follow later.

This variation within type and consequent clouding of many details of consumption is one of the main criticisms of this scheme of analysis. However, with limited funds the number of family types for analysis must be limited also. Choice then lies between very narrowly defined groups representing a small portion of the population, and broader groups representing the majority of families. For the picture of consumption desired from this Study, the latter course seemed better. For another purpose, fewer types might be preferable.

The use of the age 16 (rather than 14, 18, or 21) in type classification may be questioned by some. However, the clothing and recreation consumption of the child of 16 is approximately the same as that of a young adult. In addition, in many states school attendance is compulsory until children reach this age and child labor laws refuse them employment. Hence, from the standpoint of contribution to family income and the burden of family support, this age classification seemed desirable.

In recommending types to be used in future studies, experience seems to indicate that type 7 might be dropped in urban areas if funds are limited. This type constituted only 3 per cent of the random sample in the small cities of the Northwest. Much time and money was spent in

[3] See p. 35 for description.

trying to obtain the number of such families desired for the controlled sample. There would be less justification for dropping this type in farm areas where large families are more prevalent. The social worker and the educator would be loath to see this type dropped, since it is the large family rather than the small which has the most difficulty in making ends meet with a limited income.

In any large-scale research project, the by-products—the data which can be used for purposes other than those for which the study was primarily planned—are a valuable contribution. The classification of families by types throws light upon the differences in composition of families in different occupational groups and income groups. For example, such analysis as has been made, to date, seems to bear out Rowntree's theory that the urban family passes from a period of limited income in the beginning of its life cycle, through a more prosperous period, and back again to limited income, with old age. (This seems less true of farm families.) In the small cities of the Northwest the peak of the curves showing distribution by income of families of types 1, 2, and 3, falls in the income class $1,000–$1,249. For family types 4 and 5, each with at least one potential earner (16 or older) in addition to husband and wife, the peak of the curve falls in the income class $1,500–$1,749. Classification of families by type for the presentation of data concerning number of earners per family also will help answer questions concerning the burden of family support carried by the principal bread-winner. Numerous other examples of valuable by-products of information from type classification could be made.

To summarize: For research directed toward depicting consumption patterns of communities and areas, the family seems to be the most desirable analysis unit since it is the most important consumption unit. Because there is so close a relationship between family composition and consumption, it seems essential to differentiate between large and small families, familes having young children and those composed chiefly of adults. The seven family types used in the current Study of Consumer Purchases are representative of those most commonly found in our population and therefore representative of frequent consumption units.

Discussion (See page 46.)

METHODS OF MEASURING VARIATIONS IN FAMILY EXPENDITURES*

By Faith M. Williams[1]
U. S. Bureau of Labor Statistics

THE STUDY of consumption bristles with problems of methodology. It is, in fact, a study of our entire economic order from an angle which is only just now becoming familiar to the economist. The recent depression has made a large number of people aware of the fact that we need to know much more than we do about consumer demand, and has emphasized our ignorance of the factors causing variations in family expenditures.

Most statistical studies of family expenditures have been analyzed so as to provide average expenditures at different income levels with no measurement either of variations in expenditures, or in the types of families represented at each income level in the sample studied. In recent years the reason for this limitation of the analysis has been, I am quite convinced by discussion with research workers in this field, lack of funds. The difficulties of sampling in family expenditure studies, and the very considerable expense involved in *securing* the data have in most cases exhausted the funds available from government agencies and foundations before the analysis of variance was begun. Ogburn, Canan, and Muse in the United States and Bowley and Allen in England have some published material on variations in expenditures. The Bureau of Labor Statistics, the Bureau of Home Economics, and the National Resources Committee have unpublished data on the subject.

The very extensive material on the family expenditures of wage earners and clerical workers gathered by the Bureau of Labor Statistics in the District of Columbia in 1916, and in Philadelphia in 1918 was subjected by Professor Ogburn to a correlation analysis to show how family expenditures in these two cities changed with changes in income and family size. The families selected for the analysis included only white families living in rented houses, without lodgers or boarders other than children living with the parents. Size of family was measured in terms of the equivalent adult male scale used by the Department of Labor until recently as a measure of the demand for food. In this scale a man equals 1.00, a child 3 years old or less 0.15, and women

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[1] The author is indebted for assistance in the analysis to Gertrude Schmidt Weiss, William C. Shelton and other members of the staff of the Cost of Living Division of the Bureau of Labor Statistics.

and older children fractions in between. This analysis produced some very interesting results, but their value is impaired by the general lack of confidence in the scale used for measuring family size, as a satisfactory general index of consumer demand.

At the present time the Bureau of Labor Statistics in its study of the expenditures of wage earners and clerical workers is using a composite method of measuring family size. This method involves the use of three different scales finally combined into one measure of consumer demand, which is being called a consumption unit. The scale measuring relative demand for food is based on the Bureau of Home Economics estimates of the cost of food actually consumed by individuals of different age and sex in urban families of low and moderate income; the clothing consumption scales are based on the actual clothing expenditures of the families concerned in six different regions of the country. The third measure used for the remainder is the equivalent number of persons dependent on the family income for a year. These three measures of family size are divided into the expenditures of the given family for food, clothing, and other items, and the three quotients summed to give total expenditure per consumption unit. The total number of consumption units in the family can be obtained by dividing the expenditures per consumption unit into the total family expenditures. This composite method of measuring consumer demand is at best an approximation to a more accurate method which can be developed with correlation analysis from the very extensive material on consumption being made available through the research now in process. Classification of families by expenditure per consumption unit depends both on amount of income and the number of persons dependent on the income. For example, a family of two adults, a father in factory work and a mother at home, and two children, with an income of $1,500, may save $50 during the year, spending $1,450 for consumers' goods, and will have relative freedom in spending, at a level of $401 per consumption unit. On the other hand another family with an income of $1,500, but with eight members, including a father in factory work, a mother at home, a sister in clerical work, and five children, also saving $50 in the year and spending $1,450 for consumers' goods, will be considerably cramped in its spending at a level of $208 per consumption unit. In the twenty cities for which figures are now summarized it has been found that there is a steady increase in average family income with increase in expenditure per consumption unit, and a steady decrease in average family size.

Material has recently become available on differences in the distribution of expenditures by families of employed wage earners and cleri-

cal workers in New York City at different levels of expenditure per consumption unit. These materials show the percentage of total expenditure going to food, declining steadily and rapidly with increases in the expenditure level of the families studied, from 45.6 per cent at the lowest level to 30.3 per cent at the highest. The percentage going to housing and household operation declines slowly and irregularly. On the other hand the percentage allocated to the purchase and operation of automobiles increases very rapidly with increases in the expenditure level from 0.2 per cent at the lowest level to 4.1 at the highest. The percentages spent for furnishings and equipment, medical care, and recreation also increases, but not so strikingly. The percentage spent for transportation other than by automobile, and for personal care have a very stable relation to total expenditure, the one taking about 3.3 per cent of the total and the other about 2.0 per cent. One of the most interesting pieces of information brought to light by this method of classification is the change in expenditures for medical care with change in economic level as measured by change in expenditure per consumption unit. At the lowest economic level for which the data have been summarized, average expense per person for medical care of all types was $4.70 a year and at the highest level $40.97. All medical expenses *incurred* in the period covered by the schedule are included in the figures just quoted whether or not they were paid within the period. The figures on the amount of services received from doctors in home visits and office visits show similar increases and indicate that only a part of the larger payment per person can be attributed to the higher rates charged by this profession to the more affluent. On the other hand, average expenditure per clinic visit varied from $.28 at the lowest economic level to $1.05 at the highest, and may indicate a graduation of fee in relation to ability to pay. No information was secured on the amount of medical care received without any money charge by the families included in the sample.

The fact that the Bureau of Labor Statistics' investigation of the family expenditures of wage earners and clerical workers was undertaken for the purpose of providing new weights for the Bureau's indexes of living costs has made it necessary to give priority to the computation of average expenditures such as those just cited. The analysis of variations is a second stage of the study which is just now getting under way. The computation of standard deviations has gone far enough to show how very great are the variations in expenditures at given income levels of families of given types as we have classified them. Perhaps life in American cities presents a wider range of possible living arrangements to the families of employed wage earners and cleri-

cal workers than many people predicted when we began this study. However, we may discover that we need for our analysis finer classifications by family type. Perhaps we must distinguish not only families of "husband, wife and no others," but "families of husband and wife, both working," and "families of husband and wife, husband working." We may need to classify families of given composition by age of husband and wife, and by age of children, separating families with all children under school age, all children in grammar school, and all children in high school. Such a classification would enable us to establish representative expenditures at different periods in the life cycle of the family. The more the data from this investigation become available, the more I am impressed with the similarity from one city to another in the movement of the average consumption pattern from one expenditure level to another, and in the diversity of the consumption pattern of families of different type at given economic levels.

It is possible to select from the 1,000 families of employed wage earners and clerical workers studied in New York City, three controlled samples of 60 families each, all the samples restricted to families with homemakers born in the United States, each sample restricted to one family type, and each sample having an equal number of cases at each income level. The influence of income having been held constant in this way, it should be possible by comparing the figures from three samples to analyze the influence of family type on spending. The first step in the process is to compare coefficients of variation for different groups of items. The three family types chosen for this special analysis are as follows:

Families consisting of husband and wife only;
Families of husband and wife and one child;
Families of husband, wife and two to four children.

These figures show that the increases in expenditures for food and housing with increases in family size are obviously not large enough to provide food and housing for the larger families at the same level as for the smaller ones; average expenditures for personal care and medical care per family decrease slightly but average expenditures for these items per person decrease markedly with increase in family size. Expenditures per family for recreation and for transportation decrease greatly with the addition of children, but not so rapidly as average expenditures *per person* for medical care.

If the groups of items covered in Table I are arranged by the size of their coefficients of variation, food, housing and household operation

are found to be among the lowest four for each family type; transportation and medical care among the highest three for each family type. Variations in transportation expense depend largely on whether or not the family has an automobile, and in medical care on the incidence of actual illness, as families at this income level do not spend much for preventive medicine.

The very high coefficients of variation for clothing expenditures may be due in part to the fact that these samples include both wage earners and clerical workers. The clothing standards of these two groups may

TABLE I

AVERAGE EXPENDITURES FOR ONE YEAR WITH THEIR COEFFICIENTS OF VARIATION: FAMILIES OF THREE DIFFERENT TYPES (SAMPLES CONTROLLED FOR INCOME), EMPLOYED WAGE EARNERS AND CLERICAL WORKERS, NEW YORK CITY, 1934–36*

Groups of expenditures	Families of husband and wife only		Families of husband, wife and one child		Families of husband, wife and two to four children	
	Mean expenditure	Coefficient of variation	Mean expenditure	Coefficient of variation	Mean expenditure	Coefficient of variation
Food	$541.50	20.7	$589.80	19.6	$657.50	7.6
Housing	365.80	21.2	368.90	23.4	375.20	21.0
Household operations	145.50	29.9	135.80	22.3	149.50	27.7
Recreation	119.70	48.0	106.60	41.0	92.70	28.2
Personal care	32.00	26.9	31.00	43.2	29.90	30.8
Medical care	61.90	48.0	61.30	53.3	57.90	39.7
Transportation	111.60	79.5	71.50	42.9	62.20	44.0
Clothing	161.80	47.4	178.30	38.1	146.90	79.0

* Mean expenditures are computed to the nearest ten cents.

be different enough to account for the wide range in expenditure for raiment by families of given type with the same income.

It is of some interest to compare the large size of these coefficients of variation with similar figures from the study of the expenditures of three groups of Federal employees made in cooperation by the Bureau of Home Economics and the Bureau of Labor Statistics in the fall of 1933. Similar data are available (1) for families of male employees in the professional service with incomes averaging about $3,200 including families of husband and wife only; husband, wife and children under 16 years of age; and husband, wife and children under 16 years of age with others: for (2) families with the father in the clerical service with incomes averaging $1,700 and including the same family types as the families of professional workers; and for (3) families with at least one member in the clerical service, consisting of husband and wife only, both employed, family incomes averaging $3,500.

When the groups of expenditures for each family type as defined in the study of Federal employees are arranged in rank order according to size of their respective coefficients of variation, the arrays for the three samples are, with one exception, identical. The lowest variation is in food expenditures: housing, clothing, household operation come next. Variations in expenditures for personal care are about twice as great as in food, and except for the professional employees, expenditures for recreation vary still more. In all three of these groups as among the New York wage earners and clerical workers, the highest

TABLE II

AVERAGE EXPENDITURES FOR ONE YEAR, WITH THEIR COEFFICIENTS OF VARIATION: FAMILIES OF FEDERAL EMPLOYEES OF THREE DIFFERENT TYPES, WASHINGTON, D.C., JULY 1, 1932 TO JUNE 30, 1933

Groups of expenditures	Families of Federal employees in—					
	Clerical-Administrative-Fiscal Service $1,500–$1,999 basic salary				Professional service, $3,000–$3,999 basic salary, male, sole support of wife, with or without other dependents	
	Male, sole support of wife, with or without other depedents		Female, with employed husband and no other members in family			
	Mean expenditure	Coefficient of variation	Mean expenditure	Coefficient of variation	Mean expenditure	Coefficient of variation
Food	$408.56	21.70	$617.09	24.55	$665.46	30.28
Housing	447.09	35.76	557.63	29.55	593.91	33.40
Clothing	143.43	35.99	333.98	38.53	287.82	43.01
Household operations	180.78	41.77	278.00	44.07	357.77	47.83
Personal care	27.21	46.34	67.03	48.49	45.29	45.35
Recreation	65.83	56.27	153.16	60.96	137.47	48.45
Transportation	106.93	63.99	308.82	84.92	266.24	74.85
Medical Care	62.48	87.53	125.98	94.91	166.79	91.07

variations are found in expenditures for transportation and medical care. Tests of the skewness of the expenditures of the professional employees for these groups of items show a moderate degree of skewness for all except food. The skewness of housing expenditures is most marked, and further analysis of these figures is in process to separate housing expenditures of home owners and renters whose rental payments include heat and those whose rental payments do not include heat.

The very large variation in expenditures of families of the types distinguished in the study of Federal employees made it seem advisable to define family types somewhat more narrowly in the study of employed wage earners and clerical workers. In the study of wage earners and clerical workers, however, no sampling device was available

which made it possible to control the sample, either according to income, or family type and the number of cases available at any given income level is not so large in the more recent wage earner investigation as in the Federal employees study.

The high variability of the family expenditure data with which we are dealing makes it necessary to use a very sensitive measure for the analysis of the significance of the differences between the mean expenditures of families of the same income, but different type. On that account, with the data from the three samples of New York City wage earners and clerical workers described above, we have used Fisher's z test. Means were computed as follows for the expenditures for each group of items as follows:

1. The mean expenditure by families of each of the three types at all the income levels included in the three samples.
2. The mean expenditure by families of each type at each of eight income levels (i.e., 24 means).

Deviations of the expenditure of individual families from the mean expenditure for the income group and family type to which they belong were squared and summed, and an estimated standard deviation computed based on 156 degrees of freedom. Another estimate of the standard deviation was computed from the deviations of the means for each of the three family types from the mean for all family types based on two degrees of freedom. The natural logarithm of the ratio of these two standard deviations is "z." Fisher has published tables showing the values of z which will be exceeded 5 times in 100 and 1 time in 100 if there are no significant differences among the groups, in our case between the expenditures of the three family types. Using this method, the differences between the expenditures of the different family types for food are found to be significant; the larger families spending more for food than smaller families of the same income class. The difference between the larger and smaller families with respect to expenditures for transportation is also statistically significant. The distribution of expenditures for medical care is very far from normal and the test may not be a very good approximation in this case.

DISCUSSION

It does not matter particularly that the papers just read were not available before the meeting. The ideas of these authors in regard to family expenditure studies are fairly well known from the way they have gone about the investigations under their supervision. I am greatly disappointed not to hear Miss Kneeland's paper[1] on "Design and Purposes" for it seems to me especially important to thresh out the matter of the fundamental purposes of these relatively expensive and difficult studies. Many people for many purposes of their own may make use of the published results and find them to varying degrees satisfactory. But it seems to me that those planning these investigations whether large or small should have clearly in mind their own major purpose or purposes, should relate their procedures of collection and analysis to this purpose and expect or invite criticism on the success with which they attain it. They might well, it seems to me, ask themselves what purposes one can achieve by these studies, and to what degree one can achieve a specified purpose. They should also ask how many different purposes can be satisfactorily attained by the same study. In justifying one's works, especially when large sums of money are involved and the cooperation of diverse groups of people is desired, there is a tendency to make large promises. The studies will, it is said, take the guess-work out of business, show families how to make ends meet, serve as a basis for planning by the state and by industry, disclose inadequacies in income and in consumption choices, enable us to revise our cost-of-living index, set up norms for the construction of standard budgets and disclose the "laws of consumption."

The moral issue raised if these promises are unredeemable does not concern us now, but the situation that results if the alleged purposes are irreconcilable, if they confuse the investigators in planning procedures of collection and analysis, does concern us. There is the possibility that an all-purpose study satisfactorily achieves no purpose. At any rate I repeat that there is nothing pertaining to an expenditure study that could be more profitably considered than its avowed purpose or purposes. Judging from many studies made in the past those conducting them could profitably have reviewed Bowley's statement of the three purposes of all scientific statistics: establishment of averages, description of variations and solution of problems of causation.

It has seemed to me that in design and procedures the wage-earners' study planned by Miss Williams as a necessary step in the revision of the cost-of-living index of the Bureau of Labor Statistics and this later, more comprehensive, nation-wide study in which both she and Miss Monroe have had a part move us definitely into our third epoch in the history of such studies. The first period was that of the latter eighteenth and early nineteenth century beginnings, the second dates of course from Engel who first made the statistician's approach to the problem and conceived of the purpose as that of discovering whether uniformities existed that might be called "laws." As

[1] Illness prevented Miss Kneeland from reading her scheduled paper. [Ed.]

a statistical problem these current studies mark the beginning only of the second period, the first distinct advance since the work of Engel.

It is true of course as with all other epoch-making events that here and there in smaller studies and in critical discussion there have been indications of an understanding of the nature of this problem so that it was fairly certain that once funds were available and under the control of the proper persons we would see this distinct advance. One could name names and cite references but this is not a history.

Why, one might ask, have we waited seventy years to make a distinct advance beyond Engel? It is not, as some too quickly have said, that this field has been unexplored in the sense that few studies have been made, no data collected. The publication of the Zimmerman and Williams bibliography rather definitely put the quietus on this idea. Looking at that volume, the old tendency to say, "Let's make a study," gives way to the question, "Why do we know so little after we have made so many studies?"

Our backwardness may of course be partially explained in terms of the development of statistical method. As new techniques for analysis are developed and commonly understood they are increasingly utilized whenever quantitative data are collected and analyzed. But I think our fundamental difficulty lay in our lack of clarity with reference to the purpose or purposes for which we were collecting and analyzing these data. One might summarize what was necessary for advance in this field as follows:

1. A clear understanding of the various purposes for which such studies should be undertaken—and for which they should not be.
2. A willingness to concentrate upon a single purpose.
3. An understanding of the relation between purpose and techniques.
4. A transfer of emphasis from collection to analysis.
5. A command of the techniques appropriate for collection and analysis.

The major purposes for which data on family expenditures may be collected should be differentiated one from the other since each sets up its own requirements for sampling, planning the schedule and analysis. One such possible purpose is to secure the data necessary for constructing or revising a cost-of-living index. In a paper read at these meetings three years ago Miss Wright raised various questions in regard to the requirements for such studies. Closely related, but to be differentiated is the study that aims to be purely fact-finding—to secure a record of what families of a city or region are buying or using—in other words, to discover those consuming habits which cannot be deduced from other data available as that on production, sales, imports, exports, etc.

Still another distinctive purpose is to disclose deficiencies in the families' command of essential goods and services and to discover the points at which those deficiencies appear. This is one of the oldest and probably the most frequent of the avowed purposes for which such studies have been undertaken. Obviously, however, to accomplish this purpose the investigator has

a dual problem, that of securing his data and that of selecting his standards for appraisal. The second has all too frequently been ignored or most imperfectly considered.

Finally, as an objective of these studies is the discovery of factors that control consumptive choices and the relative power of each. As Lively puts it, it is to determine the internal laws of budgetary organization and variation and to explain budgetary behavior in terms of associated, non-budgetary variables. This objective has least frequently of all been elevated to a major position and the techniques adopted that would attain this end. I call the study for which those asked to participate in this meeting are responsible epoch-making because this purpose was clearly conceived and the study admirably planned to promote it. If the analysis of the data collected can be made as intelligently and thoroughly as the collection we should know vastly more about the laws of consumption than we have hitherto known.

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MEASUREMENT OF EFFECTS OF RECIPROCAL TRADE AGREEMENTS*

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The United States has now made some fifteen trade agreements with other countries under the authority of the Trade Agreements Act of 1934. Over half of these agreements went into effect on or before January 1, 1936, and two others went into effect early in this year. Already, mostly on the basis of statistics for unduly short periods of time, there has been much controversy as to the actual influence these agreements have exercised on the volume of trade. When trade figures for 1936 as a whole become available, they will furnish a more nearly adequate basis for studying those effects.

Those Federal officials who have been active in the framing of trade agreements naturally await these fuller statistics with interest, not to say anxiety. They know that most persons, whether predisposed in favor of or against the tariff-bargaining program, will judge its utility largely on the basis of the changes in trade actually following the agreements. They have a keen curiosity to know whether the results which they had roughly forecast while working out the provisions of a given trade agreement, or which at least they had hoped might follow, have in fact taken place. Whatever may be the views of an American trade-agreement negotiator as regards the general issue of protection versus free trade, he must, in order to avoid widespread criticism, seek to obtain, from the foreign countries as a group, concessions at least equivalent in benefit to exporters to the concessions made by the United States. To accomplish this for the countries as a group each individual agreement must, in most cases, provide a large measure of such equivalence.

Imperfect as may be changes in exports and in imports to serve as a measure of the benefits resulting from concessions, they are the only measure capable of practical application in such a way as to be comprehended by the general public. Consequently the negotiator strives as best he can to forecast how the concessions asked and the concessions offered will affect the actual volume of trade.

Naturally such forecasts are more or less shooting into the dark. No one can foresee with any close approach to certainty how much a

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given reduction in a rate of duty will affect the imports of the product, even if no new causal factor in the importing or the exporting country interferes with the logical outcome. A reduction of 50 per cent in one rate, which is the maximum reduction the United States can make under the provisions of the Trade Agreements Act, may have less effect than a much smaller reduction in some other rate. Although the trade negotiating committees have before them practically all pertinent statistical information which exists concerning the various commodities under negotiation, this information by the nature of things can never be sufficient to permit accurate prognostication.

It is of course necessary, when a trade agreement is first made public, for the Government to put out statistics of some sort bearing on the relative importance of the concessions granted and the concessions received. The obvious, if not indeed the only possible, thing is a table showing for some past year or years the value of the imports into the United States, from the other contracting country and from the world as a whole, of each import commodity affected by the agreement, and the value of the imports into the other country, from the United States, of each commodity on which a concession is obtained. These figures are combined into various group totals, distinction being made especially of (a) commodities on which duties are reduced, (b) those on which existing duties are bound against increase, (c) those the continued free entry of which is bound by the agreement, and (d) those on which the concessions (chiefly by foreign countries) relate to quotas permitted entry. In addition the effort has been made in some cases to compare the average percentages by which the rates of duty on the two sides have been reduced.

In computing both the value of the trade affected by concessions, and the average percentage of reduction in duties, much of course depends on the year or years selected as a basis for the data. For example, in the case of the trade agreement with Canada, import figures were given for the two years 1929 and 1934. On the basis of the reported imports of 1929 from Canada into the United States, articles on which the duties were reduced by this country under the agreement accounted for 16.6 per cent of the imports, whereas on the basis of the imports of 1934, disregarding whiskey, the proportion was only 7 per cent. Largely by reason of the increases in duties in the United States, there had been a much greater decline between 1929 and 1934 in the imports of the dutiable articles affected by the agreement than in the imports of other dutiable articles and of free articles. Whiskey, on which the duty was cut 50 per cent, must be disregarded in this comparison because there were no reported imports of whiskey in 1929

although doubtless large quantities were smuggled in. A similar though less marked disparity between the two years compared appears in the corresponding percentages relating to imports from the United States into Canada. So, too, the average percentage of reduction in duties by the Canadian agreement, if weighted at all, will appear considerably different according as weighted by the imports of these years respectively. Thus the reduction in the United States duty on cattle would have much influence on such an average if weighted by the imports of cattle in 1929, but would have very little influence if weighted by the small imports of 1934.

Turning now from the problems of prognostication to the problems of analysis of actual post-agreement trade statistics, we naturally find the latter the easier, but still far from easy.

This paper aims to discuss statistical methods and not economic principles or public policies. The economist need not be reminded that the effects of a change in imports of a given commodity, or of commodities in general, are many and complex. A statistician might well undertake, if the data were obtainable, to present, for each commodity on which the United States has reduced the duty by a trade agreement, statistics not only of changes in the quantity of imports but also of changes in the unit prices of the imported articles, in the prices of competing domestic products, in the output of the domestic industry, in its profits, and in the wages of the workers. It would remain for the economist to appraise the relative significance of the several changes disclosed by the data, to study the complex of causes (in large part not revealed directly by the statistics relating to the particular commodity itself) which have brought about these changes, of which the reduction of duty may be by no means the most important, and finally to form some judgment as to the magnitude of the total benefits and of the total injuries—if injuries there be—resulting from that part of the change in imports which can be attributed to the reduction in the duty. Unfortunately in the case of most commodities the statistician can provide by no means all the requisite data for such thoroughgoing analysis, and even if all the data were available the economist would find it hard to draw definite conclusions.

The difficulties above outlined arise even when only a single commodity is under consideration. To attempt to generalize concerning a large number of commodities as a group is to multiply the difficulties almost geometrically. As a matter of fact, from the practical standpoint about all that can be done as regards the general effects of a trade agreement involving any considerable number of commodities is to

present, in adequate fashion, the statistics of the changes in international trade itself.

It should be borne in mind, however, that in the case of most of the trade agreements some of the concessions are such in nature that they have no tendency to increase trade, their purpose being rather to forestall possible measures which would decrease trade. I refer to bindings of existing duties against increase and bindings of continued free entry of specified commodities; the latter may relate to a larger value of trade than all other concessions combined, as was the case, for example, with the concessions of the United States to Canada. It is important that in considering the advantages or disadvantages of a trade agreement, due weight should be given to the values of such bindings.

In judging the significance of these bindings, it must not be forgotten that between 1930 and 1935 there was pretty much throughout the world a tendency toward higher trade barriers—toward smaller free lists, increased duties, and new and more severe quantitative restrictions. There is, of course, no possible method of calculating statistically the degree of probability that, in the absence of the bindings of the several trade agreements, unfavorable action affecting the commodities concerned would have been taken by our own country or by the other contracting countries. Still less is it possible to make any guess as to how greatly any unfavorable action would have reduced trade. The probability of injury to trade was doubtless small in the case of some of the commodities now protected by bindings, but with respect to others it was fairly large, if not very large.

The importance attached to bindings of free entry is well illustrated by the trade agreements with Brazil, Colombia, and Guatemala, the imports from all three of which are dominated by coffee, a free commodity. There was little room for concessions on the part of the United States with respect to dutiable commodities from these countries. Each of them, however, was willing to make important reductions in duty on American goods in exchange for the binding of the continued free entry of coffee, knowing that the imposition of a tax on coffee for revenue purposes was by no means improbable and that a tax might materially cut down the trade.

It should be noted in this connection that the true benefit of rate reductions and quota increases provided by a trade agreement may be greater than the mere difference between the old and the new rates or quota limits. In the absence of an agreement, rates might have been made still higher and quota limits still lower.

In assessing the results of any trade agreement, a majority of men

in the street, and of men in high public places as well, will hold that—apart from the value to be assigned to bindings of existing customs treatment—the United States has made a good bargain if the increase in the exports of concession-articles has been greater than the increase in imports of concession-articles; the more thoughtful, of course, will have in mind that part of the increase which can be attributed to the concessions. Where the reverse situation appears the bargain will be considered a bad one, especially if the imported articles are competitive with domestic products. To be sure, there are many persons who weigh the results by different scales. One who has a strong leaning toward freer trade, on general grounds or merely because of the position of the United States as a creditor nation, may rejoice as much over an increase in imports as over an increase in exports—possibly even more. On the other hand, the extreme protectionist, viewing any importation of competitive articles as a direct injury to our national economy, may consider a trade bargain bad even if increase of imports is less than that of exports. Some prophets of isolation and national self-sufficiency may look upon increase either of imports or of exports as a disadvantage to the country.

The statistician as such is under no obligation to discuss these more general aspects. He has only to determine as accurately as possible the changes that have actually taken place in imports and exports of concession-articles, and so to analyze trade statistics as to throw as much light as possible on the causes of these changes, disentangling the influence of the trade agreement from the other causal factors at work. Some of the specific difficulties and problems which here confront him may now be taken up.

At the outset arises the question whether one should compare the imports, from all countries, of the articles on which the United States has made concessions with the exports, to the particular foreign country party to the agreement only, of the articles on which the foreign country has made concessions; or whether the import figures compared should relate only to imports from the other contracting party.

Perhaps the most vigorous attack of the opponents of the trade agreements program has been leveled at the practice on our part of generalizing to all countries (save such as the President excepts on the ground of discrimination against us) the benefits of 'any concession made to a particular country in a trade agreement. It is argued that this practice necessarily means loss to the United States because as regards the imports from third countries we give something for nothing. Persons who hold this opinion would naturally insist that

imports from all countries should be compared with exports to the particular country party to the agreement. The sponsors of the trade agreement program, of course, declare emphatically that this position is fallacious. They urge that we do get something in exchange for extending concessions to third countries. They point out that not merely does each of the trade agreements made under the new act provide for mutual most-favored-nation treatment, but that we already have most-favored-nation treaties with many other countries. The pledge to us of most-favored-nation treatment means that any reduction in duties which the foreign country may make in the future, whether by autonomous action or by agreement with some third country, will be extended to us. It is urged that if we did not extend to a given country the benefit of the concessions we make under the Trade Agreements Act, it would be at once in position to terminate its most-favored-nation pledge to us. As regards countries with which we have no most-favored-nation agreements, some in fact give us the benefit of any concessions they make to third countries, and with others it is hoped to make most-favored-nation arrangements in the future.

Without necessarily taking sides in this controversy, it must be self-evident that any analysis of the effects of a trade agreement should show separately the imports from the other contracting party and those from all other countries. This distinction is of much interest to those engaged in the trade agreement program themselves. Naturally, in framing a trade agreement with a given country the United States aims in general to make concessions only on articles of which that country is the largest, if not the overwhelmingly dominant supplier, being thus in position to get as much as possible directly, and not merely indirectly, in exchange for its concessions. How far, as a matter of fact, the United States, in making a given trade agreement, has achieved this object may be revealed by comparing changes in our imports of the concession-articles from the other contracting country with those in our imports of them from third countries.

In this connection mention must be made of the errors which sometimes arise with respect to the true country of origin of imports. On account of indirect trade movements, the imports accredited to a given country may often overstate or understate the true contribution of that country to the trade. Although the margin of error in this respect is less marked in import than in export statistics, it is such in the case of certain commodities and certain countries as to make caution necessary in interpreting the changes in imports from the several countries following a given trade agreement. This difficulty is likely to be enhanced by the fact that the United States Department of Com-

merce is just now changing its system of recording the countries from which imports are received. Hitherto they have ordinarily been credited to the country from which the goods were consigned, which may or may not be identical with the country of origin. Hereafter the effort will be made in all cases to credit them to country of origin. This change in practive is likely in some cases to complicate comparison between pre-agreement and future post-agreement imports by countries. The difficulty could be largely eliminated if the Department of Commerce should be able, for the next two or three years, to present import data on both these bases.

The balance between concessions granted and concessions received may be measured by comparing either the percentages of increase in imports and exports or the absolute amounts of increase. Different persons will differ as to which is the proper basis.

While the trade of the United States with some countries is not far from balanced, with many countries there is normally a decided excess of exports over imports, and with a considerable number a decided excess in the opposite direction. Most persons in the United States, whether in government authority or otherwise, who have given any thought to this matter, look upon these so-called favorable or unfavorable balances of trade with individual countries as more or less natural and a subject for neither satisfaction nor dissatisfaction. They stress the idea that under the normal working of geographic and economic influences trade balancing will largely be multiangular. On the other hand, many foreign countries, particularly during recent years, have laid great stress on so-called bilateral balancing of trade; they consider it a grievance if their exports to a given country are materially less than their imports from it.

A person who considers lack of bilateral balances in trade as entirely natural might readily hold that in the case of a trade agreement with a country to which we usually sell more than we buy from it, we ought to expect a percentage increase in our exports to that country more or less equal to the percentage increase in imports from it, and thus a greater absolute increase. On the other hand, a foreign negotiator representing such a country, who views a balance unfavorable to his country as an injury, if not an injustice, may scarcely be satisfied even with equality in absolute amount of increase in trade; he would wish greater absolute increase on his side which will more nearly equalize the trade in the two directions.

The statistician as such need not discuss this question, but it becomes important that he should give equal prominence to absolute

increases, and to percentage increases in his statistical analysis of post-agreement trade.

It is obvious that in seeking to measure statistically the effects of a trade agreement on exports from the United States, use must be made not merely of our own figures for exports from this country to the other contracting country but also of that country's statistics of the imports into it from the United States. In the first place, the difficulty already mentioned, with respect to the margin of error as to country of origin of imports, is still more serious as regards country of destination of exports; the statistics of the foreign country may show much more truly the movements of the trade from the United States to it than do the American figures. In the second place, as more fully pointed out later on, the foreign statistics may throw light on the causes affecting the exports in question which cannot be gained from any analysis of our own export statistics. Finally, and particularly important, is the fact that the definitions of commodities in our export statistics may not conform to the definitions in the import statistics of the other contracting country. Concessions by the foreign country are, of course, expressed in terms of its own tariff (sometimes modified by the agreement itself to meet the particular situation). It may be quite impossible on the basis of our classifications to determine what changes have taken place in the movements of certain commodities on which the foreign country has actually made concessions.

There remain a group of problems which have to do with the methods of arranging and analyzing trade statistics in such a way as to permit the influence of the trade agreement to be distinguished, at least approximately, from that of other causal factors. The tendency of a reduction in duty to cause an increase in imports of a given commodity may be more than offset by some countervailing influence; conversely an actual increase in the imports may be chiefly due to some other cause than duty reduction. Three influences of domestic origin, which are at work today in the foreign trade of the United States, are particularly powerful—devaluation of the dollar, the marked increase in general industrial activity, and the effects of drought. Various new causal factors of importance are present also in many of the foreign countries with which we trade, including among others revolutions and currency revaluations. The world is far from being in a static condition or a condition of normal trend.

To give his fullest aid in throwing light on the effects of recent agreements the statistician would have to supply to the public not merely properly analyzed data of imports and exports but a mass of statistics

bearing on these other causal factors—data regarding production, especially of crops, price levels, gold movements, international investments, exchange rates, and what not. To enter further into discussion of this wider field would, however, expand the limits of this paper too far. Adequate analysis of the statistics of trade itself, independently of statistics of other economic phenomena, can do a good deal toward segregating the effect of trade agreements from that of other causes. The following discussion relates to methods of ascertaining the effects of those concessions of a trade agreement which involve reduction of duties or increases in quotas. As already stated, the statistics of trade cannot by the nature of things measure the effects of bindings of the existing status.

In the first place, it is evident that hasty conclusions should not be drawn from general totals without adequate breakdown by commodities. Changes in the trade in a few articles, possibly in a single article, may dominate in bringing about the changes in totals for a large group. Especially in cases where there is reason to believe that these major articles have been strongly affected by causes other than trade agreement concessions, it is essential to consider the data for them separately. It may readily prove that, when the figures for some one or few commodities, wherein other causal factors have been more powerful than the trade agreement, are deducted from the aggregate, it will be possible to draw from the remaining total fairly definite conclusions as to the effect of the concessions.

In the second place, no sound conclusions can be drawn from statistics for commodities on which duties have been reduced or quota limits raised without comparing the changes in these with the changes in other commodities entering into the trade with the given country.[1] Nor is it sufficient merely to deal with totals for such unaffected commodities; major individual items must be separately studied. It might transpire, for example, that although the exports from the United States to the other country of articles not affected by concessions had increased as much as or more than the exports of articles affected by

[1] Dr. Fetter in his discussion of this paper rightly points out that trade between the two contracting countries in commodities not covered by duty reductions may be increased as the result of the agreement, the added buying power of country A from larger exports of articles on which country B has lowered duties being used in part for additional purchases from country B of articles on which country A has made no reduction in duty. Nevertheless if the duty reductions were really effective, the increase in trade in articles affected by them would be expected, always of course in the absence of counteracting causes, to exceed the increase in trade in other articles. As pointed out in the text, due regard must always be given to other causes affecting the trade, but comparison of data for articles and groups of articles subject to duty reductions with the data for other articles must apparently be the beginning of any study of the effect of the trade agreement. It may be added that the concessions made by the two countries to one another may also favorably affect their trade with third countries, quite apart from the result of the extension of the concessions themselves to such third countries under the most-favored-nation practice.

concessions, yet that this was attributable solely to extraordinary increases in some few of the unaffected items, the special causes of which might perhaps be ascertainable.

In the third place, as regards the effect of a given trade agreement on our exports to the other contracting country, it is essential to make comparison with our exports of the same articles to third countries. Even, however, if it were found that exports to the country granting the concession had increased no more than exports to other countries, this fact would not necessarily prove that the concessions had been ineffective. Other causes may be at work tending to increase exports to third countries more than exports to the contracting country. Statistics of exports of articles not affected by concessions may throw light on such possible causal factors.

Obviously United States statistics should not be relied on exclusively, or even chiefly, in judging the causal effect of the concessions obtained for our exports. The import statistics of the foreign party to the agreement should be studied, comparing its imports of concession commodities from the United States with its imports of them from other countries, and comparing concession with non-concession articles in its import trade.

Of course, if the foreign country follows the practice, which the United States itself follows, of extending the benefit of any concession which it makes in a trade agreement to all other countries (or to many other countries by reason of most-favored-nation agreements), a concession to the United States will not tend particularly to increase the share of the imports of the commodity in question which is supplied by the United States. Where concessions are not so extended, however, the statistics of the foreign contracting country as to the origin of its imports may throw direct light on the effects of the concession. Moreover, the concession to the United States may itself have represented the removal of a discrimination against us in the rate of duty. This was the case with great numbers of concessions in the Canadian agreement. The grant by Canada to this country of all the lowest rates payable by any non-British country (or of still lower rates than had previously applied to any such country) meant the wiping out of a multitude of differentials previously existing in favor of most other important non-British countries, and, as regards many commodities, a reduction in the differentials against us in competition with British countries themselves.[2] In cases of this sort also the foreign statistics

[2] Some of the original gain to the United States in this latter respect was withdrawn by subsequent Canadian legislation reducing certain of the British preferential rates on articles the rates on which to the United States had been reduced.

will, of course, tend to show whether the United States has gained relatively to other supplying countries as the result of the concessions granted to it. Again where, as in the case of several of the recent trade agreements, concessions granted by the foreign country to the United States relate to quota limitations on imports, comparison of changes in its imports from the United States with changes in its imports from other countries is essential to understand the effects of the agreement on our trade, particularly if concessions of this sort had been in the nature of removing discriminations in quota allocations previously existing.

A general analysis of the import statistics of the foreign party to the agreement, relating not merely to articles affected by concessions but also to other articles, and relating to imports not only from the United States but also from other countries, may readily disclose causal factors at work within the foreign country tending to increase, or to decrease, its imports in general, and thus may help disentangle the particular effect of the concessions granted to the United States in the trade agreement.

In the use of the trade statistics of foreign countries to measure the effects of our trade agreements with them, special caution must be exercised with respect to the influence of changes in exchange rates on the significance of value figures expressed in foreign currencies or converted from such currencies. I am not here referring to the tendency of variations in exchange to stimulate or to check international trade, a matter which of course needs to be considered among the causes determining actual trade changes; our own statistics both of imports and of exports are of course affected by this cause. What is here specially involved is the interpretation of foreign statistics of value of trade. The United States, for example, has made trade agreements with the Netherlands, Switzerland, France and Belgium, among other countries. All four of these countries have devalued their currencies since the agreements were made, and this action may not merely have an absolute effect on the trade with the United States in both directions, but may likewise tend to confuse the interpretation of their value figures of imports and exports.

The last point which the limits of time will permit me to mention is this: The statistician, in order to afford a proper basis for determining the effects of a trade agreement, must not be content to compare merely the figures for a given period immediately following the trade agreement with the figures for the last corresponding period preceding it. Regard must be given also to the antecedent trends, the more so because, with the rapid changes in domestic and foreign economic con-

ditions during the years 1933–35, these trends were often conspicuous. An increase during the period following the agreement over the immediately preceding period may have different significance according as the trade had been tending upward or downward before. Obviously, in considering these longer trends all the precautions against misinterpretations which have already been mentioned must be taken.

It may seem that with so many complexities in the use of trade statistics there can be little hope of drawing from them any conclusion worth while with respect to the effect of the recent trade agreements upon the volume of our import or our export trade. This conclusion, however, is unwarranted. Although in the case of many of the trade agreements sufficient figures have not heretofore been available to justify very definite conclusions, one may reasonably expect that after more time has elapsed it will be possible from trade statistics to form at least approximately correct judgments with respect to the influence of most of these agreements. In some cases the results are likely to be so marked that even superficial analysis will disclose them fairly well. In other cases, however, fairly extended and thoroughly conscientious analysis will be essential. It is to be hoped that a number of economists and statisticians outside the Government, especially those whose connections are such that there can be no question of having an axe to grind, will give thorough study to this subject. Some government employees who undertake such analyses presumably are not free from bias and even the most objective studies by Government agencies may be suspect in some quarters.

Discussion

With the larger part of Dr. Durand's paper I am in full agreement. His painstaking analysis of the complex problems involved in measuring the effects of a trade agreement should do much to reduce the output, but improve the quality of the statistics which the public are asked to accept as evidence of the success or failure of the Trade Agreements program.

My principal critical comment is that Dr. Durand has set himself a practically impossible task when he tries to measure the benefits of an agreement, without bringing into the analysis any preconceptions in regard to international trade that might seem to be tainted by free trade or protectionist views. One cannot measure the effect of a reduction of duties, either by this country or some other country, without implicitly introducing some assumptions in regard to the operations of international trade. I appreciate Dr. Durand's position as a government official. But it seems to me that in a conscientious effort not to appear in the role of a pleader for the Trade Agreements program, he has set up unduly strict standards for judging the agreements. In his desire not to bring in a bias in favor of the agreements, he has presented a technique of analysis that involves too narrow a conception—a

conception generally associated with high protectionist thought—of the ramifications of international trade. Almost inevitably, on the basis of his analysis, a number of agreements will be judged failures in the eyes of the public, even though the highly mercantilist objective of the Act—the stimulation of exports as much or more than imports—is achieved.

Dr. Durand's analysis deals primarily with measuring the effects of a single trade agreement, upon the trade between the two countries concerned, in the articles covered by the agreement. I question two practices in his technique in the measurement of the effects of an agreement: (1) the limitation of the analysis of the benefits of the agreement for American exporters to articles covered by the agreement, and (2) the treatment of articles bound on the free list or at the existing rate of duty.

The Belgian agreement covered a wide variety of articles, both exports and imports, but it touched only about one-third of our exports to Belgium, and about one-fourth of our imports from Belgium. An increase of $5,000,000 in imports of Belgian articles covered by the agreement and $1,000,000 in articles not covered by the agreement will give Belgium $6,000,000 more to spend somewhere than they had before. Without introducing any extraneous influences—such as drought or industrial revival—it is not only possible, but probable that with existing demand schedules on the part of Belgian importers, more than $1,000,000 of that $6,000,000 would be used in purchasing American articles not covered by the Agreement. There is nothing unreasonable in the assumption that exports to Belgium would increase $6,000,000 as a result of our increased imports from Belgium but that $3,000,000 of this sum would be in concession articles and $3,000,000 in other articles. If I interpret Dr. Durand correctly, the statistician would be forced to conclude that the Belgian Agreement had materially stimulated our imports from Belgium, as imports of articles on which concessions were granted increased five times as much as imports of articles on which no concessions were granted, but that it had very little effect upon our exports to Belgium, as American exports on which no Belgian concessions were made increased as much as exports on which Belgium had made concessions. Any attempt to measure the results of a Trade Agreement, and the "relative importance of the concessions granted and the concessions received," by considering only the changes in trade of articles on which concessions[1] were made, is at best of doubtful value.

Another defect in the statistical measurement of the "benefits resulting from concessions" arises in the treatment of articles bound on the free list. In a great many cases, both in the United States and abroad, articles bound on the free list are ones which had been there for years and which would probably remain there, trade agreement or no trade agreement. To picture the United States as making sacrifices when it agrees to bind coffee, silk, or rubber on the free list hardly squares with the realities, even on the basis of

[1] Contrary to what appears to be a general belief, the term "concession" does not appear in the Trade Agreements Act. But critics as well as Administration spokesmen have chosen to use it constantly in their discussions of the various agreements, despite the misleading implication that a country is doing a favor when it consents to receive goods and is receiving a favor when it is allowed to get rid of goods.

a highly protectionist view of American foreign trade. Since the Tariff Act of 1890 the "untaxed breakfast table"—with due concessions to the beet sugar interests—and the free admission of raw materials—with due recognition of the political power of the woolgrowers—have been as much a part of the American protective system as have been the duties on textiles and steel. We know this out of the mouths of arch-protectionists themselves. Yet in a number of trade agreements the "concessions" made by the United States have consisted largely in the binding of articles on the free list, inasmuch as practically all of our imports from those countries were already on the free list—approximately 97% in the case of Guatemala, 99% in the case of Costa Rica and Honduras, 94% in the case of Colombia, 90% in the case of Brazil. If an analysis of the effects of, say, the Costa Rican agreement, is made and these duty free articles are included in the analysis, the resulting "effect" of the agreement and the estimate of the "relative importance of the concessions" will be very different than if we only include those articles on which the duty is reduced.

American cotton is on the free list in most countries. In the trade agreement with Belgium our cotton was not bound on the free list, but it has been in other agreements and it may well be in future agreements. Assume that in the case of a country—let us call it Europa—which purchases about as much cotton as Belgium, the binding of cotton were the principal concession made to the United States. Including the bound cotton as a concession article in the Europa agreement, the statistical analysis might show the agreement advantageous to the United States. Were cotton not bound on the free list the analysis might show the agreement disadvantageous to the United States, even though American cotton remained on Europa's free list. The statistical measurement of the effect of an agreement in terms of the value of the "concessions" is going to depend in a good many cases on the vagaries of negotiation, which result in the mentioning or ignoring in the agreement of articles which would have remained on the free list under any conditions.

A point basic to the whole question of policy under the Trade Agreements program is the wording of the Act. Dr. Durand's emphasis on the necessity of securing benefits to American exporters in clearly in accord with the intent of the Act. The Act represents a step toward a more liberal commercial policy. It recognizes that there is a relation between exports and imports, and it envisages this relation and on a world wide, and not merely on a bilateral basis. To anyone who has followed American tariff debates, this is almost an epoch making advance in American thinking. But there is no recognition in the Act of the existence of invisible items, and the plain implications of its words are that the benefits of foreign trade are found in the exports, and that the imports are simply a necessary price that America must pay for the privilege of selling goods. The only purpose for which the President may lawfully enter into agreements is "expanding foreign markets for the products of the United States." Under a strict construction of the Act, no account may be taken of any invisibles: the fact that a country or its citizens owe large sums in the United States, and that the more liberal American

tariffs would facilitate payment on these debts could not be considered in making the agreement, for this would be affording "market opportunities for foreign products in the United States" for a purpose other than the expansion of American exports. No agreement could consider the existing gold situation in the United States, by creating "market opportunities" in the hope that increased commodity imports would facilitate the export of gold, or at least stop the influx of gold. We have the paradox that the more successful the program is in helping an adjustment of our trade to our international position, the greater the grounds that critics have to charge that the Act has been violated by the framing of agreements which permitted imports to enter for a purpose other than the development of exports.

I do not criticize the Administration for the wording of the original Act; public opinion, no matter how misguided, is a potent force. That explains the paradox, but it does not remove it. The Administration may leave the wording of the Act unchanged when it comes up for extension in 1937, and simply ignore any criticism that its purpose is not being strictly carried out. Or it may change the wording so that the adjustment in the international economic position of the United States may be taken into account, and thus face the criticism that the Trade Agreements Act is being amended in the interest of foreign labor and Wall Street bankers. I leave it to those who are experts in public opinion and in the strategy of Congressional legislation to tell which is the better policy of dealing with the paradox which exists.

I concur heartily with Dr. Durand's closing remarks that we will need "extended and thoroughly conscientious analysis" of the operation of the various agreements. But I would like to raise the question whether analysis, no matter how conscientious or careful, will be helpful in determining larger questions of policy unless it is backed by a pretty fundamental philosophy—theory, if you will—of international economic relations on the part of the American public.

There is a specious appeal in the idea of statistical analysis divorced from any preconceptions of theory. To approach the problem of the trade agreements without a recognition of the international economic position of the United States, without a philosophy of international trade and finance, is as futile as to approach the problem of heart disease without having any ideas in regard to the circulation of the blood. The technical statistical analysis must be implemented in public discussion by attention to the triangularity of trade, the role of current invisibles, international debtor and creditor positions, and by a willingness to face the question whether imports are a good thing in themselves or only an unfortunate price that must be paid for the privilege of exporting. Unless this is done statistical analysis of the trade agreements, no matter how technically competent, will produce nothing but sterile debate, and will muddy still further instead of clarifying the waters of American thinking on international trade and finance. To implement this analysis is the special responsibility of the academic economist, and of the banker, the business man and the journalist with economic vision.

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STATISTICAL METHODS IN BALANCE-OF-PAYMENTS ESTIMATES*

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In introducing the first official statement[1] on the balance of payments of the United States, former President Hoover, then Secretary of Commerce, explained the importance of the compilation as follows:

> A full comprehension of the invisible items and their approximate value is not only of profound importance in assessing our international balance sheet, but no sound conclusion can be made concerning the effect of foreign-trade movements upon our credit structure or upon the ability of foreign countries to purchase our commodities or to pay their debts, or upon exchange rates, or upon the movement of gold, or the ultimate trend of price levels compared with those of other nations without some comprehensive balance sheet including the invisible items.

The sudden shift of the United States from a net debtor to a net creditor position during the World War and the inevitable international economic readjustments which followed directed special attention to our statistics of international commerce, and emphasized the need for detailed examination of our so-called invisible trade including international security transactions. In 1919 the Harvard University Committee on Economic Research published the first[2] of a series of studies which prepared the way for the Commerce Department's annual compilations which have appeared without interruption since 1922.[3]

A nation's balance of international payments has been briefly defined as "an itemized account of the commercial and financial transactions conducted, within a stated period of time, by all the people of that nation with the people of all other nations." No brief definition can possibly be entirely satisfactory if it is to cover all the ramifications of international intercourse. It cannot be said that every minor element in the reported statisitics is literally either a commercial or a financial transaction. For example, such charitable contributions as

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[1] *The Balance of International Payments of the United States in 1928.* United States Department of Commerce, Trade Information Bulletin No. 144, September 14, 1923.

[2] Bullock, Charles J., Williams, John H., and Tucker, Rufus, "The Balance of Trade of the United States," *Review of Economic Statistics*, July, 1919, pp. 216–254.

[3] The Harvard Committee's subsequent studies covered the years, 1919, 1920, and 1921, respectively, and appeared under the following titles: Vanderlip, Frank A., and Williams, John H., "The Future of Our Foreign Trade," (*Review of Economic Statistics*, Supplement, April, 1920, pp. 1–28); Williams, John H., "The Balance of International Payments of the United States for the Year 1920," (*Review of Economic Statistics*, Supplement, June, 1921, pp. 169–212); Williams, John H., "The Balance of International Payments of the United States for the Year 1921," (*Review of Economic Statistics*, July, 1922, pp. 201–214).

are made by American agencies to recipients abroad in the form of merchandise involve transactions which are reflected in the international balance and yet require no international exchange operations. Since it is frequently impracticable to eliminate the recorded export value of such merchandise from the official foreign trade statistics for entry in the balance of payments, it becomes necessary to make allowance accordingly for the value of such contributions in the appropriate "invisible import" account which covers all remittances and contributions whether or not effected through the international transfer of funds. This distinction, however, applies merely to one of numerous details which constantly arise, and we need not pursue the point further in a discussion of the statistical aspects of balance-of-payments methodology.

The balance-of-payments statement is, strictly speaking, a "balancing" of payments statement in which total receipts or "credits" are necessarily equal to total payments or "debits." Since it contains some outward similarities to both a corporate balance sheet and a corporate income statement, the statistical data contained therein have readily lent themselves to misinterpretation and to direct use for the advocacy of opposing commercial and financial policies. Since the balance necessarily deals with the movement of cash funds or the offsetting credit equivalents, it obviously carries no record of losses on investments as, for example, the discounts at which American banks have in recent years found it necessary to liquidate German mark payments on outstanding Standstill credits. The desirability of supplementing balance-of-payments estimates with a statement showing the international investment position of the United States and, if possible, the changes in this position from one period to another, is apparent. This must not be confused, however, with the itemization of the aggregate cash claims which a country accumulates in a given period of time against the rest of the world or with the transactions through which those claims are met.

Some of the more important estimates in the international balance are the tourist items which are based on questionnaire sampling. Others represent the aggregate of data reported by individuals or institutions and comprising all the transactions which fall within the definition of a specific item. Again, in various instances data reported previously by official agencies are employed for balance-of-payments entry, although frequently important adjustments of such reported figures must be made for the purpose of final entry. Frequently certain items are the net result of all of these approaches. Owing to the heterogeneous nature of the data involved and the importance of inductive

analysis, statistical procedure becomes of paramount importance in any attempt to assess the accuracy and reliability of the final statement. The various classes of international transactions differ widely in adjustability, as well as in their ultimate effects on each other. Gold movements may, for instance, result from the lack of balance between the value aggregates of the respective trade and service transactions, or they may represent the convenient medium through which frightened capital flees across international frontiers.

No official data on international commerical or financial transactions are available which do not at least theoretically require adjustment for balance-of-payments purposes. In the use, however, of such statistics as gold and silver exports and imports and United States government receipts on war-debt account only minor errors are involved. Possible discrepancies in the imports of gold and silver may arise from year-end variations between the respective dates of customs entry and actual settlement (expecially the postponed payments representing from two to ten per cent of the value of the individual shipments) and from minor errors in import entries covering ore importations. Official data on war-debt receipts during several years in the late 1920's were slightly excessive for balance-of-payments entry because of the discount at which debtor governments were able to purchase United States government bonds acceptable at par under the debt funding agreements.

The official statistics on merchandise exports and imports require numerous adjustments for balance-of-payments entry.[4] These adjustments involve deductions from, and additions to, the reported data as well as numerous changes due to terms of sale, credit losses, fluctuations of exchange rates, erroneous customs entries, undervaluations of goods subject to ad valorem duties, overvaluations of certain classes of duty-free goods for bookkeeping convenience, additions to invoice entries for duty purposes, etc. Certain of these adjustments (for example, sales of bunker fuel to foreign vessels) can be made without difficulty because of the availability of accurate data. Others are based on inductive analysis and may or may not be reasonably correct. In a large number of cases no satisfactory approach to the problem is possible without a prior exhaustive study of export and import entries on both a commodity and a country basis. This remains a fruitful field of research for the future, and it is one the importance of which has been greatly increased by developments in international exchange markets during the past five years.

The outstanding examples of balance-of payments estimates based

[4] Cf. Mears, Eliot G., "The Foreign Trade Statistics of the United States," this Journal, Vol. 30 (September, 1935), pp. 501–516.

on questionnaire sampling are those pertaining to American tourist expenditures abroad. Four separate questionnaire forms are employed to cover, respectively (1) United States citizens visiting those foreign countries in which visas are required, (2) alien residents of the United States traveling abroad, (3) United States residents visiting Canada by motor car, and (4) United States residents visiting Canada by rail or steamship. It has been impossible thus far to devise a satisfactory method of similar sampling in the case of United States residents traveling in countries entry into which requires no passport or travel visa. This class includes the major part of so-called cruise travel, exclusive of round-the-world cruises, and travel in most of the Caribbean and Central American areas. Estimated expenditures by United States residents in Mexico are based in part on statistics made available by the Mexican Government, and in part, on data compiled by United States consular officers in the border districts. Estimated expenditures by foreign travelers in the United States, exclusive of outlays here by Canadian tourists, are somewhat unsatisfactory since no practicable means has yet been devised to determine average per capita expenditures here, either for the aggregate of foreign visitors or for individual groups of travelers.

Such items as governmental receipts and payments, and charitable, religious, and educational contributions, are the unadjusted aggregate of all reported sub-items comprising the total. The same applies somewhat to immigrant remittances since the percentage of the total item subject to estimate is small. All of the principal remitting institutions are now reporting every month to the Department of Commerce, but only the aggregates of these reports are made available by the latter.

Probably the most important estimates for the purpose of our discussion are those pertaining to interest and dividend items. At the present time these items are the result of detailed computations, and may be viewed as "estimates" only to the extent that the incompleteness of certain data enforces the need for a small omission estimate. The importance of these items in balance-of-payments methodology is enhanced by the fact that they are directly associated with the statistical procedure involved in the determination of the country's creditor-debtor position on both long-term account and short-term account.

American investments abroad are comprised largely of two general classes, namely, "portfolio" investments and "direct" investments. The former are principally represented by bonds and other securities publicly-offered in the American market or purchased in the international markets. "Direct" investments pertain largely to what may be

briefly viewed as American corporate investment or equity participation in foreign enterprise. The line of demarcation cannot always be clearly marked, and it is not necessary for our present purpose that we attempt precise definition.

Annual interest receipts from American investments in foreign dollar bonds, which constitute the bulk of so-called portfolio investments, are based on actual computations by individual issues. Deductions covering annual redemptions and sinking fund purchases are made on the basis of returns to a special questionnaire form submitted to every banking institution acting as agent or trustee. It is thus possible to compute accurately the total interest payments made on all foreign dollar bonds originally sold in the United States and still outstanding although the various classes of partial payments, scrip payments, and blocked-currency payments have since 1931 introduced certain difficulties in determining the exact value of dollar receipts. In the attempt to arrive at a correct balance-of-payments entry representing actual receipts by residents of the United States an even greater difficulty has developed during the past five years. Since 1931 a substantial value of outstanding foreign dollar bonds has returned to foreign hands. Estimates of repatriations, and purchases by investors resident in countries other than those of the issuers, have had to be based on the estimated net inflow of cash funds for the purchase of foreign securities. The absence of fully accurate data covering the payments for bonds repurchased by foreigners, and the varying prices at which the respective securities were sold by American holders do not permit a necessarily accurate computation of the face value. Any possible error in estimating such repurchases will necessarily be reflected in the estimates of interest payments on outstanding issues which should be credited to foreign holders. Although satisfactory data covering the value of repurchases of certain individual issues have been acquired through the cooperation of the foreign borrowing entities and their fiscal agents, any data regarding aggregate repurchases will have to be viewed as subject to slight error unless based on a detailed study in which all paying agents (and, in the case of defaulted issues, foreign borrowing entities) can be induced to cooperate.

The margin of error in the computed interest receipts, after allowing for estimated interest paid on outstanding issues which have been repurchased, is certain to be relatively small as compared with the possibility of error in the estimated dollar returns on American direct investments in foreign countries. Nevertheless, the careful and painstaking studies made during the past eight years by Dr. Paul Dickens of the Finance Division of the Bureau of Foreign and Domestic Com-

merce have converted what was once a kind of "no man's land" in international investment statistics into a distinctly manageable problem. As a result of a comprehensive survey made by Dr. Dickens in 1930 and based on detailed data furnished by approximately 1,750 American corporations, and data recently made available through the Securities Exchange Commission, it is now possible to estimate the returns on this class of investment in some of the more important foreign areas with a reasonable degree of accuracy. Although the originally-reported book values of some of these foreign properties have undoubtedly undergone material change during the depression, and have accordingly lost their original value as a basis of estimating income, the annual estimates of income received from abroad have been based more and more on current data furnished by the corporations themselves. The estimates for 1935, for example, were based on data submitted by a number of the larger companies whose aggregate investments abroad comprised over 55 per cent of the total. In order, however, to make possible a reappraisal of the investment value of the foreign properties and assets of American companies, a new survey is being conducted at present on a somewhat more detailed scale than that of 1930.

The problem of estimating interest and dividend payments by the United States to investors residing abroad has been somewhat more complicated, and the reported data on interest and dividend payments on foreign investments in this country are more likely to be in substantial error than the estimated receipts on American investments abroad. Space does not permit a summary of the efforts made prior to 1934 to estimate the value of these investments and the annual interest and dividend payments thereon. The data at present available are based on a comprehensive study initiated in the Finance Division of the Bureau of Foreign and Domestic Commerce in 1934. Full account had to be taken of the heterogeneous nature of foreign investments here. Probably in no other country have the opportunities for small-block equity investment been so alluring to alien investors as in the United States. At the same time a considerable volume of the total is represented by direct investments, equity interest in insurance companies, and investments held in personal and corporate trust accounts, all of which may be viewed as more or less permanent investments. Any effective method of procedure in computing or estimating the total investments had to take into account the necessity of so grouping the investments that each group could be conveniently used as a basis for determining, with a fair degree of accuracy, the total income derived by foreign holders. The manner in which the various types of invest-

ment were grouped suggests in general the methods employed in collecting and compiling the data. The values reported under the respective categories fall under varying approaches. Direct investments are based on computed book values or net capital invested; bonds and preferred shares are shown at par; common stocks are reported at market value; insurance investments represent the net equity of foreign insurance companies in their American branches or affiliates; and the value of securities held in trust accounts for foreign beneficiaries was determined by capitalizing the computed returns paid to such beneficiaries. These returns were based on data submitted by trustee institutions covering the total income from such investments paid to beneficiaries abroad.

Since the primary purpose of the study was to determine interest and dividend payments, all bonds, including defaulted issues, were entered at par value. The market value of common shares was used as a basis of valuation not because it was considered entirely satisfactory, but because no other approach seemed to be practicable. For the principal purpose in view the value of the shares could be considered as of secondary importance. The data relative to the number of shares of each stock issue held abroad, either directly or through bankers' or brokers' nominees, provide for the first time a convenient basis for computing total dividend payments made to investors in foreign countries. Owing to the mixed nature of the investments administered by trustees for foreign beneficiaries, the income paid to the latter proved the only basic data that could be acquired with the result that in this case the investment figure was derivative instead of primary.

I am inclined to view the classification by general categories for purposes of comparative analysis as a matter of secondary importance in the official presentation of the various estimates. There are obviously limits to the propriety of discussing in an official document the bearing of particular groups of data upon international trade theory. In the final analysis individual types of transactions must be considered apart from the theoretically related items. For example, during the past three years considerable attention has been called to the importance of gold imports in our balance of trade. In certain quarters the argument has been advanced that the exclusion in the official balance of international payments, of gold from merchandise trade has reflected a "favorable" balance when, in fact, the balance on merchandise account (including gold) and the balance on trade and service items combined have been "unfavorable."

I shall not enter here upon a discussion of the question of whether or not the heavy net inflow of gold during recent years has been a "favor-

able" or "unfavorable" factor in our national economy, nor need we consider at the moment the causes and possible consequences of the heavy net inflow of short-term and long-term capital which represented in substantial volume a statistical offset to the gold movement itself. In clarifying and restricting the problem I believe it may be appropriately suggested that in a realistic approach to the balance-of-payments statement the terms "favorable balance" and "unfavorable balance" have become meaningless, and should be permanently eliminated from balance-of-payments terminology. The qualitative elements in the international balance and its wider implications cannot be averted by a mere regrouping of items. If the inclusion of gold in the merchandise account were to be determined solely by the "commodity" nature of the metal, the problem would be relatively simple. An examination of gold movements over, say, the past ten years indicates that at times the counter factor to gold exports and imports was reflected in merchandise and service transactions, while at other times, as during the past three years, it was very definitely reflected in capital movements. An item that adjusts itself so readily to changes in political and financial conditions throughout the world tends to distort the normal influences of trade reflected in the other non-capital items if the aggregate of so-called trade and service items is uniformly defined as including gold movements. The presentation of gold (and in the United States this would include silver since 1934) as a single category does not presume to deny that gold is a commodity, but it is rather a formal recognition in the statistics of international trade that gold is a special kind of commodity which may move very irregularly and in enormous volume for reasons distinctly unrelated to the normal demand for goods and services.

It may, of course, be said that if such a distinction were made in the case of gold, the same might be said about other commodities, especially under conditions prevailing in 1933 when certain commodities were apparently exported, often on consignment, as a means of converting dollar assets into balances or investments abroad for the purpose of greater security. It must be remembered, however, that no items in the international balance can be defined with absolute precision. Few items represent to the last dollar only such types of transactions as fall within the scope of clear definition. A certain but unknown fraction of so-called immigrant remittances has frequently consisted of capital transactions since they represented transfers of savings accounts. Certain of the so-called government transactions have in recent years represented, in effect, capital payments, but it is impossible to segregate them, and they thus fall statistically within a definition which literally does not apply to them.

Should the so-called service category include "dividend and interest" items? The latter do not represent directly a demand for economic goods and services, but rather fixed charges which (unless payment is deferred or defaulted) constitute a direct measure of the exchange requirements needed in the process of transfer. The answer to our question depends somewhat on the number of categories into which the international balance should be divided for convenient analysis. As already indicated, for purposes of detailed analysis most items must be considered separately. The elimination of interest and dividend items from the so-called service transactions does not confine the latter in any event strictly to items representing the demand for economic goods, as, for example, in the case of remittances and contributions. The inclusion or non-inclusion of interest and dividend items in the service category in a statistical summary of the balance is of secondary importance provided the individual items are clearly defined. In any statement in which grouping is confined to comparatively few general categories, I believe that the practice followed by the League of Nations[5] and the Department of Commerce of including interest and dividends in the service category represents an appropriate method of presentation.

By the very nature of the balance-of-payments statement it follows that a correct evaluation of all items should bring all recorded "credits" and "debits" into balance. Yet it has happened that in certain years, notably in 1934 and 1935, the total recorded payments or "debits" exceeded the recorded receipts or "credits" by comparatively large amounts. The failure to reduce such substantial unidentified items into their component parts or to determine the identity of each of these parts limits the value of the statement accordingly. It has already been pointed out that certain estimates must necessarily be arrived at by methods which permit neither satisfactory sampling nor the use of adequate collateral data. This suggests the probability that the methods of preparing the estimates may in certain cases tend to overestimate the debit items or to underestimate the credit items. If such a tendency were inherent to a marked degree in the estimate of a particular item only, it might be assumed that the residual item itself would reflect a more or less definite trend from year to year. Although the methods of determining the various items were substantially the same in 1934 as in 1933, the net result in 1934 was a debit excess of $482,000,000, whereas in 1933 the excess was the virtually negligible figure of $38,000,000. This suggests that in 1934 the marked difference

[5] The Annual Memoranda on balances of payments prepared by the League of Nations were initiated in 1924 with the publication of the *Memorandum on Balance of Payments and Foreign Trade Balances, 1910–1923.*

between the respective aggregate credit and debit estimates resulted from conditions peculiar to the international movements of that year. For this reason the official bulletin took special cognizance of the unprecedented inflow of gold and the marked inward movement of long-term and short-term capital. In a separate section an attempt was made to explore the possibilities inherent in these movements, and to suggest roughly the transactions which constituted the discrepancy. This approach represents, in my view, the maximum extent to which the author of the annual compilation should permit himself to venture into a statistical disposition of the residual item. The necessity for making occasional guesses must not be permitted to become magnified to the point where the wish to strike a balance becomes father to the thought. The abnormality of many international movements during recent years has undoubtedly introduced many elements which cannot at once be isolated or quantitatively measured. The probability of substantial errors in the figures reported by original sources and the likelihood of pronounced year-end lags in certain types of transactions are merely a few of the possibilities which should be explored by detailed and patient study of related items covering a period of years.

IMPROVED OBJECTIVE STANDARDS OF SALES PERFORMANCE*

By Donald R. G. Cowan
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A primary function of good management is to evaluate the performance of different divisions of a business organization. One of the most baffling problems has been to find yardsticks or standards by which to judge sales performance. Two different salesmen may obtain quite different results, even though under the same or similar circumstances. Furthermore, a salesman's effectiveness may vary under different regional conditions. Accordingly, the problem of devising standards of performance has been approached from several viewpoints.

Students of personnel emphasize the importance of the salesman's characteristics as affecting performance. Given the proper personal traits, performance will ordinarily be as good as can be expected. Accordingly they catalogue all pertinent facts regarding each salesman and each applicant for a sales position, and evaluate the contribution of each characteristic by analyzing the ratings placed by sales supervisors upon the performance of different salesmen. In one study of 2,724 salesmen, the effects of various environmental and personal traits were studied, including father's occupation, upbringing in country or city, personal appearance, height, weight, education, age when hired, extent and characteristics of previous employment, and marital status. This was done by grouping and subgrouping the salesmen according to the characteristics, obtaining their composite ratings in each group and comparing these ratings for various groups. Table I illustrates the method.

TABLE I
RELATIONSHIP BETWEEN APPEARANCE AND PERFORMANCE OF SALESMEN

Appearance	Number of salesmen	Average rating, per cent
Excellent	297	78
Good	1,231	66
Fair	393	51
Bad	18	42

Since these characteristics are known when employment begins, the study enables better selection of salesmen. For the type of selling involved, the study indicates that prospective salesmen, raised in the city, about 21 years of age, attractive in appearance, ambitious to

* A paper presented at a Joint Session of the American Statistical Association and the American Marketing Association, Chicago, December 28, 1936.

learn as indicated by extra-curricular studies, and rated high in the preliminary training school turn out to be the best salesmen. Neither height, weight, marital status, nor a college education seem to have any definite effect. The usual relationship between a man's age and his performance, rising to an apex between 35 and 40 years of age and declining afterwards, is quite marked. More frequently, country bred salesmen are discharged for unsatisfactory work, and city bred men for bad habits of various kinds.

In other types of selling the effects of these characteristics may vary both in direction and importance. Furthermore, additional characteristics may deserve consideration. In commission selling, for example, whether a man is an only son, or is the eldest, middle, or youngest of

TABLE II

PERCENTAGE OF SALESMEN'S TIME DEVOTED TO VARIOUS ACTIVITIES

	Average	Salesmen				
		I	II	III	IV	V
Travel between stores	23	26	27	25	13	23
Waiting in store	13	7	15	16	18	13
Selling and collecting	31	31	32	26	31	34
Miscellaneous	19	17	12	25	23	10
Detail work	15	19	13	8	15	22

the family, or has a wife that is belittling, whining, extravagant, mothering, indifferent, or helpful, may affect his sales performance.

The most serious limitation to this approach is that it assumes sales supervisors to be capable of judging performance in different regional markets. Area, population, income, wholesale and retail outlets, roads, and many other market conditions affect performance. Hence, the supposition that if a salesman's characteristics are as good as average, his performance will be satisfactory, begs the question. Different selling conditions require salesmen possessing different characteristics. The sales manager desires measures of markets by which to evaluate performance and to shift salesmen in his quest for the most productive combination of market and personnel characteristics in each area.

The engineer tends to the opposite extreme in stressing the physical differences between markets and their effect upon performance. Miles traveled, calls made, and hours worked by salesmen vary widely and produce different results. The industrial engineer's methods of measuring time and motion may be applied to these phenomena, providing a basis for physical standards of performance. Table II shows the results of a recent study.

The standard chosen may be the average of the group, the perform-

ance of the best salesman, or an ideal composed of the best elements in individual performance.

Obviously, the apportionment of time between the different activities depends upon the mileage of each route, the number of interviews to be made, and the like. Consequently, the engineer's analysis includes such ratios as are illustrated in Table III.

TABLE III
MOTION AND TIME PER INTERVIEW

	Average	Salesmen				
		I	II	III	IV	V
Miles driven	2.6	2.5	3.1	2.8	.9	2.9
Total time (minutes)	28.0	25.0	29.1	28.5	32.8	26.4
Time spent in store	12.2	9.7	13.6	11.2	16.1	12.2
Waiting	3.8	1.9	4.4	4.3	6.0	3.3
Selling	8.4	7.8	9.2	6.9	10.1	8.9

Here again, standards may be derived, such as the average, or the highest, or the ideal as judged by competent persons.

These studies are often valuable to sales managers. They reveal the small proportion of time spent in contact with sales prospects, and the large proportion devoted to physical and routine work. As illustrated in Table IV, further analysis may reveal mal-distribution of time, which is partially controllable by salesmen.

TABLE IV
MAL-DISTRIBUTION OF SALESMEN'S TIME

Waiting* (minutes)	Percentage of total time spent in	
	Interviews	Waiting
None	54	—
1–10	35	44
10–60	11	56

* Time spent waiting to talk to dealers.

This approach encounters several difficulties. In measuring physical activities, there is a real difference between plant workers and salesmen. A standard based upon the amount of work done during one minute by a skilled plant laborer under normal conditions at a normal rate of speed requires that all conditions affecting performance are the same for similar workers and the only variable is the operation being timed. Salesmen, however, do not work together under identical conditions, but travel in residential and shopping sections, foreign-born, negro, and native white communities, under conditions of greater or

less competition. As Table V shows, country and city bred salesmen must have different standards. Comparability of physical performance in standard-making requires the selection of routes having similar conditions. When these are widely separated, standards are less acceptable to the salesmen involved.

The salesman who performs the most operations per hour may not be the best salesman. If he spends a longer time arranging retail displays for larger dealers in order to improve sales, he should not be judged inefficient and penalized because the number of calls made per hour, miles traveled per hour, and similar measures of his physical efficiency have declined. The mechanical viewpoint must be extended to consideration of the end product and the conditions affecting it. Realizing this difficulty, the engineer may calculate the sales volume

TABLE V
SALESMEN'S UTILIZATION OF TIME

	City	Country
Miles per call	0.7	2.7
Minutes per mile	4.4	3.0
Travel, minutes per call	3.6	7.2
Interview, minutes per call	9.4	11.2
Miscellaneous, minutes per call	5.2	8.2
Total minutes per call	18.2	26.6

per hour or per interview and endeavor to make systematic allowances for physical influences upon these ratios.

Certain important discoveries may be made. Beyond a certain stage, the adding of salesmen in order to reduce travel time yields smaller additional sales with each added minute of selling time. The same tendency is found when the proportion of salesmen's time given to selling a particular product is allowed to vary.

Second, equal time devoted to different products yields different amounts of sales. Salesmen not only attempt to sell some products more often than others, but the proportion of successful attempts varies greatly. Furthermore, as indicated in Table VI, there is a direct relationship between frequency of attempts and successful attempts, indicating that salesmen follow the line of least resistance.

Since the time spent per attempt to sell each product is often about the same, the wide variation in the physical effort necessary to sell equal units of different products is apparent. Diminishing returns take place more rapidly in selling some products.

Third, the relative importance of large and small stores on a sales-

man's route affects the volume per minute of selling effort. Calling on additional stores of smaller size will reduce the volume per minute of interview time and increase the volume per minute of traveling time at a different rate. The engineer would extend coverage to a point of maximum effectiveness, beyond which volume per minute tends to decrease. Obviously this most favorable point of coverage varies regionally and depends upon many factors, both physical and economic in nature. Moreover, extension beyond this point might be profitable.

Fourth, the differences between areas, other than customer size and

TABLE VI
VARIATION IN ATTEMPTS TO SELL DIFFERENT PRODUCTS AND ITS RELATIONSHIP TO SUCCESSFUL ATTEMPTS

Different products	Ratio of sales attempts to total interviews	Ratio of successful attempts to total attempts
A	75	51
B	49	46
C	34	31
D	31	39
E	19	31
F	10	16

type, affect both the time spent in coverage and the volume sold. All conditions which go to make up markets from an economic standpoint must be considered.

Fifth, the engineer has been troubled by the variations from time to time in the sales volume per unit of effort. Here again, the limited approach does not allow for changes in business conditions, supply and demand, competition, and the like.

The economist has stressed the differences in regional consumption.[1] The characteristic method has been to estimate the total consumptive possibilities of each area and to compare the portions of total consumption sold by a company's salesmen. However, lack of consumptive data has often made necessary the use of less dependable measures of the market. For example, variations in native white or total population were regarded as indicating general variation in the regional consumption of many staple foods.

An early practice was to compare the regional percentages of the population with corresponding percentages of the national sales of the

[1] For a detailed discussion of the economist's viewpoint on this subject, see the following papers by the author in the *Journal of Business* of the University of Chicago: "Sales Quota Determination," Vol. VIII (1935), pp. 225–256; "Regional Consumption and Sales Analysis," Vol. VIII (1935), pp. 345–381; and "Sales Analysis from the Management Standpoint," Vol. IX (1936), pp. 52–76, 170–188, 231–257, 368–388 and Vol. X (1937), pp. 14–29.

product. The difficulties involved led to the practice of comparing the per capita sales of different areas, using either the average performance or the best performance as a standard. Now, many executives clearly recognize that variations in per capita sales are not solely due to differences in selling ability. The influences of numerous other regional characteristics are being measured by simple and multiple correlation and combined into estimates of consumption or of sales with which actual performance may be compared. Table VII provides a simple illustration.

TABLE VII

PERFORMANCE IN SELLING A PRODUCT IN SIX AREAS
(Standards based on analysis of 48 areas)

Area number	Sales per 1000 people	Estimated sales (standard)	Percentage actual sales of estimated sales	Performance ranking
1	37	20	185	5
7	23	10	230	1
11	21	26	81	37
18	15	14	107	21
31	10	16	62	42
38	6	5	120	17
46	3	7	43	48

While these methods of deriving standards of performance from performance itself represent a very important forward step, important aspects of the problem remain to be considered. First, regional variations in sales may or may not parallel those in total consumption because the characteristics of the individual product may differ from others of the same class. A high quality, high-priced product may sell in greater volume in high income areas than lower quality products. Consequently, the distributor should analyze his own sales in order to learn more exactly how varying regional characteristics affect the sales of his own product. On the other hand, this analysis does not show him clearly what those relationships might be and what proportion of total consumption he might obtain were he to change the character of his product. Thus, a knowledge of total consumption remains of some importance in appraising sales performance.

As a second complication, regional sales of a particular product are affected by four kinds of factors: consumptive, merchandising and competitive, pricing, and effort. The decisions of management affect the last three to a varying degree. After measuring the influence upon sales of all types of factors, two standards of performance may be derived; one based on the separate effects of the consumptive factors only, and the other on the combined effect of all the factors. Standards based

only on the former indicate what regional consumptive possibilities would be if customers could be persuaded not to buy competitive products. They help in the more effective distribution of various forms of effort and enable the appraisal of all the elements in sales performance, including management's direction of effort.

On the other hand, all types of measurable influences should compose the standard if the purpose is to compare the performance of regional sales organizations, assuming the present regional selling and advertising effort is fixed in quantity. This sales index makes possible the closer approximation of the ability of the sales force in each territory under existing measurable conditions relating to consumption, merchandising, pricing, and quantitative expenditure of effort.

The third difficulty is that existing regional relationships may not hold to the same degree in later years and, as a consequence, standards derived from one year's sales may not be dependable in judging another year's performance. Changes may take place in a product's price or consumer purchasing power, and different classes of consumers varying in regional importance may enter the market for some products or shift their consumption to different products. Consequently, repeated yearly analyses of sales are desirable from time to time in order to provide the information necessary for periodic adjustment of standards.

Fourth, the analysis of volume, important and beneficial though it is in sales management, is not sufficient in setting ultimate standards of performance. The selling prices of some products are not fixed and are not regionally uniform, even though tending to uniformity after allowing for transportation costs. The ability of salesmen to charge what the traffic will bear might be judged by comparison with average gross margins of numerous areas were it not for the influence upon regional margins exerted by other factors such as competition, purchasing power, consumer insistence upon obtaining certain products as a result of advertising, regional relationships between consumption and prices, the importance of different types and sizes of buyers, and the varying proportions of products sold at different margins.

The salesman, however, is an economic unit, and sales performance consists not only of selling quantities of goods at different prices and margins but of earning profits in so doing. Ultimate standards of performance should, therefore, include consideration of effort and of expenditures in relation to income. The engineer's measurements of the physical activities in selling must be converted to an economic basis. For instance, the tendency for each succeeding minute of selling time to yield smaller additional volumes must be converted to a comparison

of the income obtained with expense incurred in order to learn how far it is economical to extend the expenditure of time and effort. Salaries and other expenses vary regionally. Varying amounts of effort and expense are necessary in selling different products. Small and large buyers and various types of outlets require varying direct selling expenditures, in some instances exceeding the gross income obtained. The point of greatest net profit on a salesman's route is not alone determined by tendencies in travel time and other physical activities or by tendencies in volume, margins, and expenditures taken by themselves, but by the optimum combination of them under the economic conditions of each area. Naturally there is wide variation in the ability of salesmen as well as of management to accomplish this end under the varying conditions of place and time.

The ultimate to be sought must, therefore, be standards of performance in earning profits. While these standards may seem impossible to devise at present, continuous analysis of sales phenomena in order to uncover many fundamental tendencies and to see their importance will continue to carry us nearer the goal. In the meantime, the use of standards of volume, of physical effort, and of money expenditures, of gross profits, and even of the characteristics of sales personnel may serve as stepping stones to the ultimate goal. They must be used cautiously and with the full knowledge that, when coupled with incentives for their attainment, too much stress on volume, on physical effort, or on some other element of sales performance may injuriously affect other phases of that performance and so reduce final profits below what they ideally should be.

STATISTICAL COST CURVES*

By Joel Dean
McKinsey, Wellington and Company

THE PRINCIPAL objectives of this investigation were, first, to develop practical methods for determining the behavior patterns of a firm's average and marginal cost, and second, to explore, by means of these methods the cost behavior of two sample enterprises, one representing short-run adjustments, the other, long-run cost behavior.

At the outset, the meaning of certain concepts used in this discussion should be made clear. By average cost is meant the total cost divided by the number of units of output; and by marginal cost, is meant the addition to total cost caused by the production of an additional unit or output. The short-run is defined as a period so short that the scale of plant remains fixed, and cost adjustments are therefore made by varying the intensity of use of fixed factors. The long-run refers to an adjustment time sufficiently long to permit changes in the scale of plant, assuming short-run adjustments to be optimum for each scale.

SHORT-RUN AVERAGE COST BEHAVIOR

A brief chronicle of the difficulties encountered in the investigation of short-period cost patterns will provide concrete illustrations of the most important of the methodological problems faced in determining statistical cost curves. The first task was to obtain data which would reflect short-run cost adjustments uncontaminated by long-run changes. A furniture factory was chosen whose cost records were available in considerable detail for two-week accounting periods, covering a three-year span (1932–34) during which pronounced short-run variation in operating conditions was unaccompanied by change in the scale of fixed plant.

Since this factory manufactured a great variety of models and styles of furniture a second major problem arose in devising a common denominator for measuring this diverse output. Faced thus with complex theoretical problems of joint production, the best practical solution appeared to be to cut this Gordian Knot by using as the output unit the sum of the deflated standard costs of the articles produced.[1] Since

* A paper presented at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, December 30, 1936.

[1] This standard cost was estimated in the usual fashion, on the basis of a standard quality of material, standard labor and machine efficiency and a normal rate output; it was deflated to the price and wage levels prevailing in the base period.

this output index (called hereafter "old warehouse value") is a weighted summation of standard inputs, it does not reflect changes in input caused by altered operating conditions; and since it is deflated to a base period, it does not reflect fluctuations in market price.

A third major problem was to reduce the cost observations to usable

PARTIAL REGRESSION CURVES FOR CORRECTED AVERAGE COMBINED COST WITH SIX INDEPENDENT FACTORS: OUTPUT (X_2), SIZE OF PRODUCTION ORDER (X_3), NUMBER OF NEW STYLES (X_4), INCREASE IN PRODUCTION (X_5), LABOR TURNOVER (X_7), AND QUALITY OF MATERIAL (X_8).

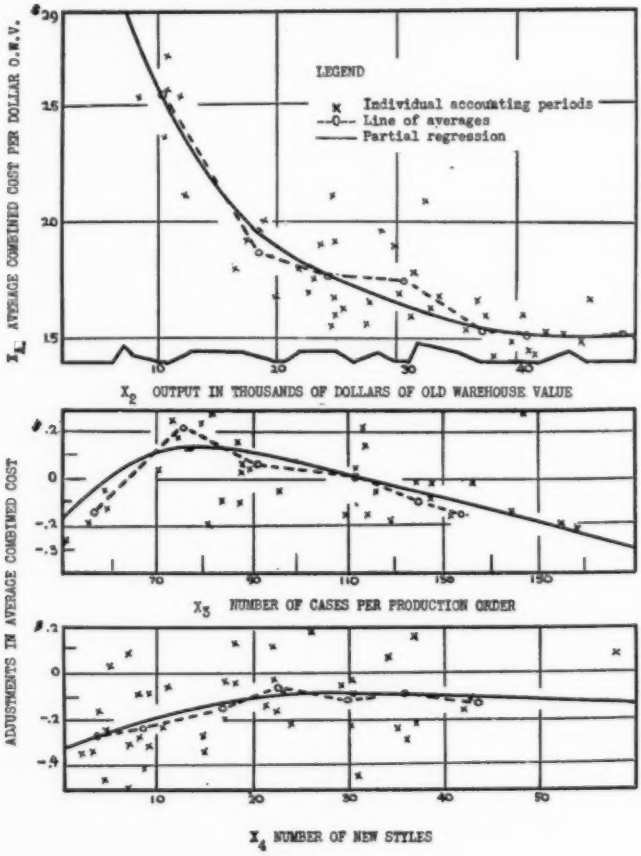
LEGEND
Individual accounting periods
Line of averages
Partial regression
X_1 AVERAGE COMBINED COST PER DOLLAR O.M.V.
X_2 OUTPUT IN THOUSANDS OF DOLLARS OF OLD WAREHOUSE VALUE
ADJUSTMENTS IN AVERAGE COMBINED COST
X_3 NUMBER OF CASES PER PRODUCTION ORDER
X_4 NUMBER OF NEW STYLES

FIG. 1a

form. In the first place, since wage rates and material prices fluctuated greatly during this tempestuous period, the time series of dollar costs had to be corrected for rate changes. This adjustment was accomplished by means of index numbers specially constructed for each item of cost from price data found in the purchase records of this firm. In the second place, since the firm employed a process cost system rather

than a specific order system, the data had to be adjusted for discrepancies occurring between the time at which costs were recorded, and the time at which output was reported. Lag corrections were computed for each type of cost and for each pertinent operating condition.

When recorded cost had thus been deflated and matched with recorded output, graphic multiple correlation analyses were made of combined cost and of several of its components. The following operat-

PARTIAL REGRESSION CURVES FOR CORRECTED AVERAGE COMBINED COST WITH SIX INDEPENDENT FACTORS: OUTPUT (X_2), SIZE OF PRODUCTION ORDER (X_3), NUMBER OF NEW STYLES (X_4), INCREASE IN PRODUCTION (X_5), LABOR TURNOVER (X_7), AND QUALITY OF MATERIAL (X_8).

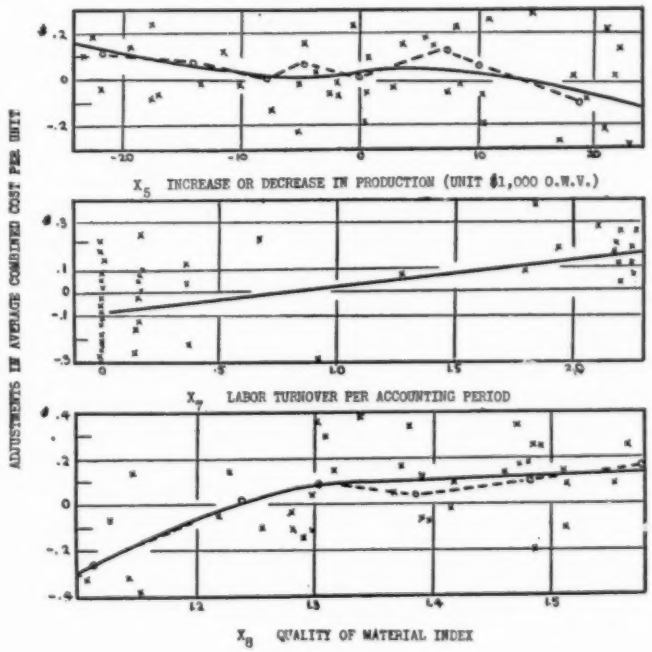
ADJUSTMENTS IN AVERAGE COMBINED COST PER UNIT
X_5 INCREASE OR DECREASE IN PRODUCTION (UNIT $1,000 O.W.V.)
X_7 LABOR TURNOVER PER ACCOUNTING PERIOD
X_8 QUALITY OF MATERIAL INDEX

Fig. 1b

ing conditions were chosen as independent variables: output, size of production order, number of new styles, changes in output from that of the previous period, rate of labor turnover, and quality of materials.

The net regression curves obtained for corrected average combined cost (Fig. 1a) are, for the most part, in accord with reasonable expectations for short-period cost behavior. Average cost continues to decline, however, throughout the observed range of output. This behavior suggests the possibility that under conditions of monopolistic competition, with rapidly rising selling costs a firm may not normally push produc-

tion to a point beyond which manufacturing costs actually rise. These data appeared to cover the entire range of variation in actual operating conditions for this plant during the past 10 years.

The important relationship of cost to the other independent variables calls attention to the inadequacy of the simplified neoclassical concept of cost as a function of output alone (Fig. 1b). Broadening the analysis to measure quantitatively the effect of other operating conditions has the additional managerial advantage of providing the informational foundation for the construction of flexible expense budgets and adjustable cost standards which considerably increase the accuracy of cost forecasts and make cost control more just and more effective.

In addition to allowing for the effect upon cost of various operating conditions these quantitative statements of relationship may aid in the control of the conditions themselves. For example, this study provides a measure of the average cost of labor turnover which, when converted into marginal form, constitutes the rational basis for deciding upon the profitability of personnel policies which will reduce turnover. Similarly, decisions regarding the proper size of manufacturing lot can be made rationally only by comparing the marginal cost of increasing the size of production order with the marginal cost of storing the resulting increment in inventory.[2]

Regression curves of the components of combined cost were also determined. These curves not only furnish detailed information needed for cost control, but also throw additional light on the character of cost behavior. It is interesting to note that so-called direct cost items were not proportionately variable with output, as is frequently claimed and that no overhead item analysed was completely invariable. Apparently most of the items of this firm's cost classification fell somewhere between the Economist's variable cost and his fixed cost.

MARGINAL COST BEHAVIOR

In using this quantitative knowledge of cost relationships for estimating marginal cost three major problems presented themselves. First, the eminently practical question, "Is full rectification of the data, by means of price correction, lag adjustment, and multiple correlation, necessary in order to obtain reliable estimates of marginal cost?" Second, "Can better marginal cost results be obtained when cost data is kept in terms of total cost per accounting period, than when it is manipulated in terms of averages per unit of output?" Third, "What

[2] Statistical measures of this type are superior to any accounting estimates, first, because they reflect the direct as well as the indirect effects of these operating conditions, and second, because they provide estimates of incremental cost and of relative importance not obtainable by accounting procedures.

methods of curve fitting and differentiation give the most satisfactory estimates of marginal cost?" To answer these questions experiments with alternative procedures were carried out in each of these three directions.[3]

After comparing the marginal cost estimates obtained by identical methods from total cost data representing four stages in the correction process it was regretfully concluded that in this particular case (which may not be typical), nothing short of complete correction of the data yielded satisfactory estimates of marginal cost.

Extensive experimentation with cost data in the form of averages and in the form of totals, in an effort to answer the second question, led to the general conclusion that more reasonable and reliable marginal cost estimates were obtained from data in the form of totals. Marginal cost curves which were derived from average cost data were found to have large, spurious fluctuations attributable to slight alterations in the curvature of the average cost function. Since marginal cost has a simple rather than a complex functional relationship to total cost, these unwarranted fluctuations in marginal cost could be prevented when functions were fitted to total cost observations.

To answer the third question, a comparison was made of the marginal cost estimates obtained from identical data by alternative methods of curve fitting and differentiation. Graphic, selected points, and least squares methods of curve fitting were tried out, and differentiation of the resulting functions was accomplished by taking tabular first differences and by means of differential calculus. It was concluded that for commercial purposes simple informal methods were to be preferred to more rigorous procedures. Freehand curve fitting gave results sufficiently accurate for the crude data used, and had the important advantages for commercial work of simplicity and economy.

Using the preferred method developed by this experimentation, marginal cost functions were obtained both for combined manufacturing cost and for several of its more important components.[4] It has already been noted that marginal combined cost appeared to be constant over the range of output included in this study. Short-run marginal cost curves have commonly been supposed to rise as output is increased, because of the operation of the law of diminishing returns. The unexpected observed behavior found in this study may merely be the result of an incomplete or non-typical sample; it may, however, indicate that price theory has failed to consider important organizational and psychological factors which work counter to diminishing returns or that

[3] For more complete analysis of this problem see the author's monograph, *Statistical Determination of Cost with Special Reference to Marginal Cost*, Chicago, University of Chicago Press, 1936.

[4] Results of the analysis of components of marginal combined cost are summarized in Appendix B of the author's monograph previously cited.

quasi-monopolistic conditions of supply of certain input factors have offset the workings of this tendency. The data are probably too crude and limited to warrant generalization concerning the character of the marginal cost function. These results are not advanced as typical or even as statistically significant, but only as suggestive of a procedure useful for further exploration.

Up to this point in the analysis of marginal cost we have devoted attention exclusively to the output margin of cost. But from the multiple correlation analyses of average and total cost we know that cost is really a function of many operating conditions, the rate of output being only one of them. Since this is the case, cost has other margins besides the output margin. For example, increasing the number of new styles has an incremental cost which is analogous to that resulting from increase in output. Neo-classical price theory abstracts from these other margins of cost. This approach is too simple for many practical pricing decisions, since the acceptance of a particular order frequently causes simultaneous change in several operating conditions. A summation of these cost increments is therefore required in order to determine the true additional cost of the order. These other cost margins, as was noted earlier, are also needed as the informational basis for rational decisions regarding the control of the operating conditions themselves.

LONG-RUN COST BEHAVIOR

As a supplement to this short-run cost study an investigation was made of average and marginal cost behavior in the long run. Data for this study were obtained from a personal finance corporation which operated about 150 branch offices, each of which was treated, for the purpose of this investigation, as an individual establishment. Limited space forbids discussion of techniques and findings. Regression curves were obtained by graphic multiple correlation analyses of combined operating cost per account using the following independent variables: size of office, measured by the number of open accounts; percentage of accounts delinquent; and population of branch office city.

The cost behavior revealed by these curves was in accord with reasonable expectations. Cost per account was higher for small offices and for offices having a large proportion of delinquent accounts; and cost increased as a logarithmic function of the size of the branch office city. These regression curves provided a highly useful and easily administered flexible standard of branch office expenses.[5] The most reliable

[5] A parallel analysis of several components of combined cost further facilitated cost control and indicated that behavior patterns of components were of the same general character as those of combined cost.

estimate of long-period marginal cost which can be made from these data is that it is constant, regardless of the scale of operation.

PRACTICAL USEFULNESS OF THIS STUDY

Neither these results, nor those of the furniture study can be regarded as typical or conclusive. Subsequent investigations, with better data and more sophisticated procedures will doubtless produce more reliable and significant findings.

The chief function of this study is to point out the obstacles to be overcome, to suggest a practical way of surmounting them, and to indicate the relevance for cost control and for price policy of the type of information provided by this study. As such, it is hoped that this investigation will be useful to economists and to business men.

Economists will find this study stimulating first, because it presents an empirical determination of cost curves which play a crucial role in modern price theory, second, because it develops a method for providing the entrepreneur with information economists have erroneously assumed he possessed (namely, knowledge of his average and marginal cost functions), and, third, because it indicates the questionable realism of certain phases of neoclassical cost theory.

Business men will find the results of this type of study valuable because these findings constitute a new type of managerial information which is highly useful, first, for constructing accurately a comprehensive flexible budget, second, for establishing adjusted standard costs, and third, for estimating marginal cost.

Budgets are most effective when they can be modified flexibly to correspond to reasonable cost expectations resulting from the particular set of operating conditions prevailing in the budget period. Quantitative knowledge of the probable effect upon cost of these conditions makes such budget modifications more accurate and thus renders the budget more useful for prediction and for control. Similarly, cost standards which can be adjusted, on the basis of known cost relationships, so as to allow for operating conditions over which the factory management has no control and for which it should therefore not be held responsible, are fairer and more effective as control devices. Finally, estimates of marginal cost obtained from statistical studies of this type are of great importance in the rational formulation of business policies, since a large proportion of executive decisions should properly be made by comparing the marginal costs of alternative methods or by balancing the marginal cost caused by a contemplated policy against the resulting additional revenue.

METHODS USED IN STRIKE STATISTICS*

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In all the realm of industrial statistics, employer-employee disputes present some of the most baffling problems. In addition to the factor of judgment which enters into all statistical procedure, strikes and lockouts, by their very nature, lead to differences of viewpoint and approach in their measurement and classification. Since they are controversies in which the interests of employer, workers and the public are at stake, each of these groups naturally interprets and evaluates the situation in the way the dispute affects it. This divergency of viewpoint persists throughout every phase of the statistical treatment of strikes and lockouts;—their definition, unit of measurement, magnitude, causes and results. Furthermore, strikes and lockouts very often are indeterminate from whatever approach they are viewed. Causes leading up to any one dispute may be many and varied and the basic causes may never be actually voiced by either party. So also with the results, especially when the dispute ends with no written contract or definite oral agreement. Even the date of the ending is not always clear-cut; some strikes begun years ago have never been officially called off by their initiators, yet the concern is carrying on its business.

In view of these divergencies of approach, indefiniteness, as well as the impossibility of always getting sufficiently detailed information, much of the statistics on strikes and lockouts is necessarily based on arbitrary estimates and rule-of-thumb procedure. Nevertheless, through the use of specific definitions and the adoption of some broad general policies, a certain degree of comparability and uniformity of treatment can be obtained. The following summarizes the definitions and methodology which the Bureau of Labor Statistics is applying to its statistics on strikes and lockouts in the United States.

PURPOSE

Statistical technique must be adapted to the problem at hand. A strike or lockout is an evidence of discontent and an expression of protest. While some strikes may arise over minor internal shop matters, by and large strikes cannot be dissociated from the general economic and political situation existing at the time, or the general condition

* A paper presented at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, Illinois, December 30, 1936.

within the particular industry. The trend of prices and cost of living, the amount of unemployment, the prosperity of the particular industry, the political situation as expressed by statutes, police and court action, the state of mind of the public, the degree of organization among the workers,—all of these have their direct and indirect bearing on the frequency and character of employer-employee disputes. The purpose of strike statistics would seem to be, therefore, to keep a count of the number of disputes and their magnitude,—a temperature recording, as it were, of the degree of industrial unrest. Since strikes are evidence of pathological conditions in our economic process, strike statistics should record and classify the causes, results, characteristics of the participating parties, and any other information which would contribute toward a better understanding of the group interests involved and the methods they use to advance these interests.

Definition of Strike and Lockout.—A strike is a temporary stoppage of work by a group of employees in order to express a grievance or to enforce a demand. A lockout is a temporary withholding of work from a group of employees by an employer (or a group of employers) in order to coerce them to accept the employer's terms.

Each word in these definitions has a particular significance:

A strike is a *temporary* stoppage: So far as the intention and attitude of the strikers is concerned, they continue to retain the status of employees of the company against which they are striking, with vested interests in their individual jobs. If the dispute develops into a permanent severance of relations between the employer and this group of workers, the situation ceases to be a strike.

A *stoppage* of work is effected either by walking out, not reporting for work at the usual or expected time, or reporting for duty but refusing to perform any work ("sit-down" strike). A walkout is a fairly clear-cut situation, but the other two forms of stoppage are sometimes difficult to interpret. For instance, workers in seasonal or intermittent trades (fruit pickers, longshoremen, building workers, etc.) refuse to go to work on terms offered by an employer. There is no actual walkout, since work has never started on the season's fruit picking, loading or unloading the boat, or constructing the building. To the employer who needs to have the work done, refusal to work means a serious stoppage. Such situations are considered to be strikes, since the Bureau interprets a strike to exist when an employer offers jobs to a specific group of workers who refuse to accept until certain terms or conditions are adjusted. Restriction of output, or sabotage, sometimes approximates a "sit-down" strike. The Bureau interprets the situation as a

strike only when the participants publicly state the fact of a stoppage for certain specific causes.

A strike or lockout implies stoppage of work by a *group*. An individual stoppage is a "quit" or "layoff." For purposes of convenience, the Bureau includes in its statistical analysis only those disputes which involve six or more persons and last one day or longer.

The strike must be by a group of *employees;* that is, there must be a recognized employer-employee relationship between the parties involved in the dispute. Statistics on labor disputes, therefore, exclude so-called buyers' strikes, farmers' strikes, such as milk strikes (except in the case of farm labor), student strikes, etc. There are certain borderline situations in which it is difficult to determine whether the strikers have the status of employee or entrepreneur, as, for example, the small dealer who is producing or distributing goods or services for another person or company. The Bureau considers an employer-employee relationship to exist when one of the parties maintains direction and control over the work of the other; that is, the right to approve or disapprove employment, and control over working conditions. Thus the term "employee" covers gasoline station attendants, even though on a lease and contract sales arrangement, fishermen who must sell their catch to one certain wholesaler who determines the price, and persons who manufacture at home for contractors.

The purpose of a strike or lockout is *to express a grievance* or *to enforce a demand.* It is a fairly simple matter to interpret a stoppage of work as a strike or lockout when either the worker group or the employer makes definite demands upon the other. Some situations, however, are not so easy to define, such as jurisdictional disputes, quarrels between rival unions, sympathetic protests, organization drives by outside unions where employees within the plant seemingly take no active part. In the usual jurisdictional dispute it would appear that the employer is passive,—that it is a quarrel solely between worker groups who have no grievance against their employer. (In some cases the employer very obviously has an interest in which union does a particular piece of work because of differences in wage rates.) Fundamentally, however, each group is demanding from the employer that it get the assignment for certain work, and thus jurisdictional disputes can justifiably be called strikes.

Disputes between rival unions present a somewhat different picture. In these cases a second group with identical trade jurisdiction seeks to displace a union which has already been recognized by the employer. (Since the American Federation of Labor does not permit dual unionism within its ranks, at least one of the two groups fighting for control

is a union not affiliated with the A. F. of L. Sometimes neither organization is affiliated.) While the immediate issue causing the stoppage of work appears to be the rivalry of two factions of workers, the employer is, nevertheless, an integral factor in the situation,—the very fact that there are two rival unions fighting for control generally signifies discontent by one group of workers with the terms which the other union has obtained from the employer and the hope that the second union can obtain better terms.

The employer-employee relationship need not necessarily be direct and proximate to permit a strike situation. In a so-called sympathetic strike, an individual employer may not be responsible for any of the dissatisfactions which bring about the strike. These are, nevertheless, strikes since they are called for the purpose of demonstrating the solidarity of workers and broadening the group pressure upon the employer(s) against whom there is a strike for specific cause.

STRIKE OR LOCKOUT

Previous to 1922, the Bureau presented separate tables for strikes and for lockouts. Because of the inherent confusion existing in any industrial dispute, the difficulty of separating a strike situation from a lockout was early recognized. In more recent years no effort has been made to distinguish the two, and all labor disputes involving stoppages of work were grouped together as "Strikes and Lockouts." This awkward phrase was abandoned in 1935, the term "strike" being used in the generic sense to include all stoppages of work due to labor disputes, whether initiated by employer (lockout) or by the workers.

UNIT OF MEASUREMENT

One of the most difficult phases of strike statistics is that of determining the basic unit to be counted and classified. Obviously, a trend of the number of strikes is meaningless unless the unit counted possesses certain uniform characteristics. An individual dispute may be viewed from the standpoint of the establishment or establishments involved, the group of workers affected, or the community or communities in which it takes place. In statistical treatment, difficulties arise from whichever angle the matter is viewed.

Shall a general strike called by an international union, extending into several states and hundreds of establishments, be called one strike or as many as there are employers, states or cities affected? Shall strikes in several branches of one corporation, located thousands of miles apart, be considered one strike or as many as the number of

communities affected or the number of local unions which agreed to the stoppage? A local union calls a strike against dozens of employers engaged in the same business in the same city. Perhaps it is the union's strategy to call out one shop at a time instead of simultaneously. Some of the employers settle with the union and work is resumed while other shops are still closed or perhaps have not yet been called out. Is this continuous campaign on the part of the local union to be classified as one strike or many? Several craft unions call a strike against the same employer. Is this one strike or shall the number of unions involved be the determining factor? A local union is carrying on a strike in a certain plant. Six other local unions in the same city decide to stop work in sympathy. Is this one general strike, two strikes, or seven strikes?

Any method used to determine the unit for statistical measurement of strikes must be elastic enough to fit the varieties of situations which arise. At the same time, any method is necessarily arbitrary when applied to any individual case. As a working hypothesis, the initiating force and cause of the strike is the determining factor now used by the Bureau in deciding what shall be the unit of measurement. In other words, how the strike was started and for what reason, takes precedence over the number of establishments or localities affected.

ITEMS INCLUDED IN THE STATISTICAL ANALYSIS

Thirteen basic items are now used by the Bureau of Labor Statistics in its statistical analysis of strikes, namely:

- Industry
- Geographical location
- Number of establishments
- Number of workers
- Sex of workers
- Beginning date
- Ending date
- Duration
- Man-days idle
- Labor organization involved
- Causes
- Results
- Method of settlement

Much could be said in explanation of the meaning and coverage of each of these items, variations of which lead to wide differences in statistical presentation. To anyone who is familiar with the typical strike situation, the complexities and difficulties in classifying strikes by their causes or demands and by their results are at once apparent: So few strikes are due to one or two clear-cut causes; fewer result in clearly defined terms which can be accurately classified. Even such an apparently simple item as "number of workers involved" is variously understood and used. Some statistical treatments include two classifications, viz., "directly" and "indirectly." The "directly involved" are supposed to include those employees who initiated or voted to strike;

the "indirectly involved" the remaining employees, or workers in other plants, who were forced to stop work when this shop closed because of the strike. Under these various concepts, the number involved could be given as 50, 5,000 or 50,000. Currently, the Bureau arbitrarily confines the number to include all employees within the establishment who stop work or are thrown out of work, thus making no attempt to separate the "directly" or "indirectly" involved.

HISTORY OF STRIKE STATISTICS IN THE UNITED STATES

The first count of strikes in this country was made at the time of the Tenth Census, in 1880. Four periodic surveys were made by the Commissioner of Labor between 1881 and 1905, these providing a continuous series for this period. No data were gathered between 1906 and 1913. During 1914–26, the Bureau of Labor Statistics maintained a fairly adequate reporting service on the number of strikes and lockouts but in only a limited number of cases were data obtained on the number of persons involved, causes, results, and other items.

Since 1927 the Bureau has collected and published more or less complete data on most of the items described above. Two years ago the statistical work was somewhat reorganized: The number of possible sources for first learning about the occurrence of strikes was materially increased—thus insuring an approximately complete coverage. The former occupational classification was changed to industry classification to conform to that used in the Census and the Employment and Pay-Roll statistics of the Bureau of Labor Statistics, and the definitions and inclusiveness of certain items were altered. In order to provide continuous series in as many classifications as possible, available data for all strikes which have occurred since 1927 have been reviewed and revised. Incomplete information on hand made revision previous to 1927 impossible. These revised tables, together with a complete summary of all the statistics on strikes in the United States which have ever been published, will be included in a forthcoming bulletin of the Bureau of Labor Statistics.

NUMBER OF STRIKES

As explained above, due to incomplete data and differences in interpretation, the figures on number of strikes occurring throughout the years are not entirely comparable. Considering the indefiniteness and proximate nature of any strike statistics, however, it would not appear unreasonable to link the various series for rough comparison, even though they were obtained by somewhat different methods:

NUMBER OF STRIKES AND WORKERS INVOLVED, 1881–1935
(1906–13 Omitted)*

Year	Number of		Index 1927–29 = 100		Year	Number of		Index 1927–29 = 100	
	Strikes	Workers Involved	Strikes	Workers		Strikes	Workers Involved	Strikes	Workers
1881	477	130,176	64	42	1906	*	*	*	*
1882	476	158,802	64	51	to	*	*	*	*
1883	506	170,275	68	55	1913	*	*	*	*
1884	485	165,175	65	53	1914	1,204	*	162	*
1885	695	258,129	93	83	1915	1,593	*	214	*
1886	1,572	610,024	211	196	1916†	3,789	1,599,917	509	514
1887	1,503	439,306	202	141	1917	4,450	1,227,254	598	495
1888	946	162,880	127	52	1918	3,353	1,239,989	451	399
1889	1,111	260,290	149	84	1919	3,630	4,160,348	488	1,337
1890	1,897	373,499	255	120	1920	3,411	1,463,054	458	470
1891	1,786	329,953	240	106	1921	2,385	1,099,247	321	353
1892	1,359	238,685	183	77	1922	1,112	1,612,562	149	517
1893	1,375	287,756	185	93	1923	1,553	756,584	209	243
1894	1,404	690,044	189	222	1924	1,249	654,641	168	210
1895	1,255	407,188	169	131	1925	1,301	428,416	175	138
1896	1,066	248,838	143	80	1926	1,035	329,592	139	106
1897	1,110	416,154	149	134	1927	707	329,939	95	106
1898	1,098	263,219	148	85	1928	604	314,210	81	101
1899	1,838	431,889	247	139	1929	921	288,572	124	93
1900	1,839	567,719	247	182	1930	637	182,975	86	59
1901	3,012	563,843	405	181	1931	810	341,817	109	110
1902	3,240	691,507	435	222	1932	841	324,210	113	104
1903	3,648	787,834	490	253	1933	1,695	1,168,272	228	376
1904	2,419	573,815	325	184	1934	1,856	1,466,695	250	472
1905	2,186	302,434	294	97	1935	2,014	1,117,213	271	359

* No information available.

† The number of workers involved in strikes between 1916–26 is known for only a portion of the total. However, the missing information is for the smaller disputes and it is believed that the total here given is fairly accurate.

ESTIMATING THE VOLUME OF RESIDENTIAL BUILDING CONSTRUCTION*

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During the recent long period of inactivity in the construction industry—when industrial depression in the United States was being made more severe by the pronounced slump in building—it was impossible accurately to describe the real importance of construction in the national economy. Such basic questions as: How much building is going on in the United States? How does it compare with building in earlier years? Where is it taking place? could not be answered. Current statistics on the construction industry, although very valuable, were limited in their usefulness primarily to indicating the general trend of construction and to giving some suggestion of the areas in which principal building activity was under way. Now we are entering into a phase of business activity in which rapidly expanding construction is of great importance, both to government and to industry, and adequate measurements of the actual amount of building are even more essential than heretofore.

In an effort to meet this need for more accurate data on the volume of construction, we have made a new series of estimates of the amount of non-farm residential building in the United States from 1920 to 1935. This paper reviews some of the problems encountered, and describes briefly the methods by which the estimates have been made.

These new estimates show the volume of residential construction to have been notably greater during the past fifteen years than any previous estimates have shown, and emphasize its importance to general business activity. In terms of dollar volume, the peak of residential construction is estimated at four and one half billion dollars or more in 1925, rather than slightly more than three billions in both 1925 and 1928 as shown in previous estimates. For the decade prior to 1930 it appears that the total volume of residential building has been consistently underestimated by as much as 30 to 50 per cent. Our preliminary estimates for 1936 indicate that the number of new units built will fall between 280,000 and 300,000, a considerable improvement over the 1933 level but still less than a third of the peak volume of 1925.

* A paper presented at the Ninety-eighth Annual Meeting of the American Statistical Association, Chicago, Illinois, December 28, 1936.

The country's housing requirements during the decade of the 1920's, as measured by dwellings built, other than on farms, totaled approximately 7,000,000 units, or an average of about 700,000 units per year, with a peak of over 900,000 units in 1925. In contrast, at the low point of building activity, in 1933, about 55,000 dwelling units were built, or only 8 per cent of the average amount during the 1920's. Fluctuations as great as these in what is perhaps the nation's largest single industry, with widespread ramifications in other industries as well, deserve far more careful attention than they have hitherto been given.

More serious perhaps is the fact that records of building available currently during the boom of the 1920's did not make evident the fact

ESTIMATED VOLUME OF NEW RESIDENTIAL BUILDING IN THE UNITED STATES OTHER THAN ON FARMS 1920–36

Number of housekeeping units built and value of all residential building, including non-housekeeping dwellings*

Year	Number of housekeeping units†	Value of all residential construction‡	Year	Number of housekeeping units†	Value of all residential construction‡
	000's	Billions of dollars		000's	Billions of dollars
1920	230	1.1	1929	520	2.8
1921	440	1.8	1930	290	1.4
1922	720	3.2	1931	220	1.0
1923	880	4.0	1932	75	0.3
1924	890	4.2	1933	55	0.2
1925	935	4.7	1934	56	0.2
1926	865	4.4	1935	144	0.6
1927	825	4.1	1936§	280–300	—
1928	755	3.8			

* Preliminary estimates, subject to revision.
† New housekeeping units only.
‡ Includes housekeeping and non-housekeeping dwellings (hotels, clubs, lodging houses, etc.).
§ Based on data for 11 months. Cost estimates not yet available.

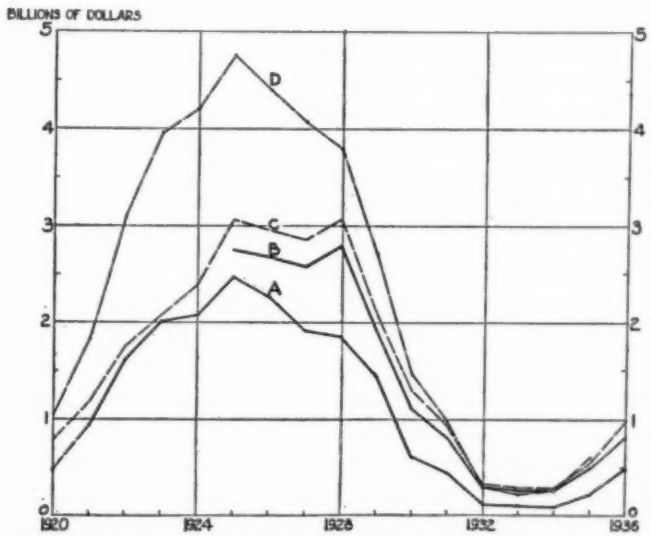
that residential construction reached its peak as early as 1925—rather than in 1928 as has generally been assumed. Thus, the decline in volume of residential building began four years before the marked industrial decline of 1929. A more general realization of this fact would have given some warning of the industrial depression.

The fact that a real revival of construction is now under way makes it urgent that we should not again find ourselves lacking an adequate basis for prompt analysis of current developments in construction. For this reason considerable attention has been devoted to this problem over the past two years by the National Bureau of Economic Research and the Social Science Research Council, particularly as a part of a broad study of real estate financing and economic stability.

In contrast to methods previously used in estimating the total volume of construction, these new estimates are based upon building permits rather than building contracts. Instead of raising the amount of contracts reported for a group of states by an arbitrary percentage to

account for states not reported, we have used ratios of the number of dwelling units built to the increase in number of families in representative cities, and, with appropriate adjustments, have applied these ratios to the increase in number of families in areas not covered by data on building permits. Separate estimates were made for large metropolitan centers, for their suburbs, for smaller urban centers, and for

COST OF RESIDENTIAL BUILDING, 1920–1936



A. New Residential Building. Building permits in 257 cities reported by Bureau of Labor Statistics (1920 based on 189 cities).
B. Residential Contracts Awarded, 37 eastern states reported by F. W. Dodge Corporation.
C. Residential Contracts, 48 states. Contracts in 37 states raised on basis of building permits each year. Total for 37 states 1920–22 based on contracts reported in 27 states; 1923 and 1924 based on 36 states.
D. Preliminary Estimates, Total New Non-Farm Residential Building—48 states. Includes non-housekeeping dwellings.
Note: Estimates for 1936 based on data for 11 months.

villages and unincorporated areas, within each geographic region. A more detailed discussion of the volume of residential construction and the methods used will be given in a bulletin of the National Bureau of Economic Research. Some of the technical problems which have arisen in the course of the study are discussed below.

Basic data for making estimates of the total dollar volume of residential building both currently and over a period of years are confined largely to two series: contracts awarded, as reported by the F. W. Dodge Corporation's Statistical Research Service, and building permits as reported by the Bureau of Labor Statistics. (See curves A and B on chart.) Other statistics on building permits are available over a

considerable period of years, but do not segregate residential from nonresidential building. The data available on quantity and value of production and shipments of building materials, and on construction employment and payrolls are of limited value for estimating volume of residential construction. This discussion of problems and methods is therefore related principally to data from the F. W. Dodge Corporation and the Bureau of Labor Statistics.

The F. W. Dodge data represent reports made by that firm's commercial representatives in large and moderate size population centers on building other than on farms in the 37 states east of the Rockies, involving contracts of more than $2,000 for new buildings and $1,000 for repairs. Prior to 1930 the minimum was $5,000 for both new building and repairs. The Dodge reports therefore have not undertaken to provide information on any construction projects involving contracts below these limits. It seems probable that the total volume of contracts excluded by these limitations has been of considerable importance, especially during the 1920's. Estimates of total cost of residential building based on contracts awarded should therefore include some allowance for value of new building involved in contracts of less than $2,000 in recent years and $5,000 in earlier years.

Any estimate of total dollar valuation of contracts for the country made from the Dodge data requires an estimate for the 11 western states. However, such an estimate cannot safely be made by adding a fixed percentage to the total contracts reported in the 37 eastern states because the trend of building in the western states at times has varied widely from that of the remainder of the country.

For estimating the number of dwelling units built, from the data supplied by the F. W. Dodge Corporation, the number of dwellings in one- and two-family dwellings can be derived from the number of buildings of these types reported, but the number of dwelling units in apartments and other types of dwellings are not given. The rough approximations of units that may be made from data on square feet of floor space are not satisfactory. Thus, neither a 37-state total nor a 48-state total of family units built can be projected directly from the contract data.

The other principal source of construction data is the Bureau of Labor Statistics. This agency obtains data currently on building permits from local building authorities in nearly 2,000 cities having 2,500 or more population but reports for only about 1,500 of these cities are included in the data published monthly. Among the items furnished by the permit are, type of structure, number of units, and estimated value of proposed structure as declared by the applicant. These data

give some representation in all 48 states, though the coverage is not uniform for states or regions. Also, coverage changes from time to time, in the case of cities which annex territory. There is no representation for permits in areas outside city limits, nor in places under 2,500 population, or on farms. Thus neither of the principal sources of data on construction provides a uniform coverage for various parts of the country.

For areas not covered by the Bureau of Labor Statistics, the most practical method found for estimating units built is to apply to the increase in number of families in these areas, ratios of building to increase in number of families in the reporting cities. Marked differences in rates of growth and building make necessary separate estimates for metropolitan centers, and for their suburbs, smaller cities, and rural areas within each geographic region. We estimate that in the last building boom, 70 per cent of all non-farm dwellings built were in metropolitan districts, nearly half of this amount being in the suburbs. Also, of all non-farm dwelling units built, about half were in the Middle Atlantic and East North Central regions.

In contrast to estimates of an aggregate amount of building over a period of years, based on the increase in number of families, estimates of volume for any one year cannot safely be made on the increase in families, especially since 1930. Other factors, such as credit conditions, changes in workers' income, building costs, or abnormal vacancies may have more influence on building than the increase in families in certain years. In the absence of sufficient data on these factors as they relate to building, it is possible to estimate the building volume in unreported cities on the basis of building rates in the reporting cities of similar size, using the 1930 census data on population, with modification. Such estimates are facilitated by the present segregation by size groups of the 1,500 cities for which the Bureau of Labor Statistics publishes permit data.

However, caution is needed in the use of this method. Grouping of cities by size may give quite misleading results because it averages together cities having widely differing rates of building activity and their average may not be representative of the unreported areas. This is true particularly of the group of small cities now reporting to the Bureau of Labor Statistics which is overweighted by cities which are satellites of large metropolitan centers. In the past, these satellite cities have constituted the most rapidly growing segment of the entire population. The list of cities of 2,500–5,000 population for which reports are now published includes over half of all cities of that size falling within metropolitan districts, but less than one-fourth of the

isolated communities of the same size remote from the influence of large centers.

These problems encountered in estimating total building on the basis of building permits apply to volume either in terms of number of family units, or dollar valuation. Estimates of dollar volume have the additional uncertainty as to how accurately permit valuations reflect actual construction costs. Permit valuations are known to be too low in some cities where tax assessors use them for taxing purposes, or where permit fees are based on the estimated cost given in the permit. On the other hand, in boom times, permit figures may be overstated for sales purposes.

Another item of uncertainty in the permits figures is the number of permits granted, but for which actual construction is long delayed, or cancelled, or for other reasons not started. This is sometimes an important factor in certain cities.

In using the building permits series for 257 cities, as published by the Bureau of Labor Statistics, to estimate building volume over a period of years, allowance must be made for a downward bias, becoming more pronounced since 1928 or 1929. The bias is due to the fact that building permits, limited to areas within city limits, do not reflect the increasingly greater activity in the environs. Some evidence of this bias is given by real property inventory data on number of structures by year built, which show an increasing proportion of dwelling units built in the environs outside city limits of the large metropolitan cities. The bias is further indicated by estimates of total non-farm building based on the increased sample of cities in recent years, which show that the volume of all building outside the 257 cities has been increasing relative to that in the 257 cities. Thus, with the 257 cities tending to under-represent building over a period of years, and the current list of 1,500 cities tending to over-represent building, the two series should not be linked, for purposes of long-range comparisons.

In contrast to the downward bias in the permits series for 257 cities, there appears to have been an upward bias in the series of contracts awarded. Estimates of the total volume of residential building in the country based on contracts in 37 states are much below the new estimates presented herewith. Much of this difference apparently was due to the exclusion of contracts under $5,000 prior to 1930, but some may have been due to change of coverage when volume was rising rapidly in the early 1920's. Some idea of the extent of this under-reporting may be obtained by means of several rough tests. For example, if Curve "C" represents substantially the amount of building the F. W. Dodge Corporation would have reported had they covered all 48 states, a total

of $22.2 billions is indicated for the 10-year period 1920 to 1929 inclusive. This total includes cost of hotels. Even if this indicated volume of construction were all in housekeeping dwellings, and the average cost per family unit were as low as $5,000, the Dodge minimum for single contracts, it would represent only 4,440,000 units for the decade. This falls considerably short of the 10-year increase of 5,500,000 in the number of occupied non-farm dwelling units reported by the Census of 1930. It is 2,560,000 units less than the probable total of about 7,000,000 units built during the decade, when allowance is made for 1,500,000 additional units built to offset demolitions, fire and other losses, and to allow for the increase in vacancy between 1920 and 1930. The exclusion of contracts under $5,000 involving many one-family dwellings would go far toward explaining the difference in trend shown by the contract and permits series.

Even if satisfactory country-wide estimates can be made from either contract awards or building permits data, difficulties arise in interpreting the results with respect to the time at which the construction work actually occurs. Both permits and contracts report a lump sum as of a given date, but the actual expenditure for materials and labor may be spread over many months. There are practically no series reporting such expenditures currently. The nearest approach is that represented by payrolls of reporting firms in the construction industry published by the Bureau of Labor Statistics. This series has only partial coverage of the industry and does not include value represented by labor performed by the individual builder or small contractor.

The problem of estimating new construction on farms either for dwellings or for all building presents greater difficulties than for construction in cities. Practically no data similar to contracts awarded or building permits are available as a current sample on farm construction. Census data on number of farms and farm families require considerable interpretation for use in estimating net requirements for new dwelling construction.

The difficulties which have been enumerated, and others encountered in estimating the volume of residential building, suggest certain desirable improvements in the available series. For example, the value of the F. W. Dodge reports on contracts awarded would be materially enhanced if coverage could be extended to all 48 states, or even if made to include only the three Pacific Coast states. Also inclusion of data on number of family units in contracts for respective types of dwellings is desirable. Maintenance of complete and uniform coverage is of prime importance.

In the case of building permits, test studies are needed to show the

relation of permit valuations and actual construction costs. Local agencies should be encouraged to establish methods of reporting permits actually executed, to eliminate at least periodically, the exaggeration of permits figures due to permits granted, but allowed to lapse. In publishing building permits data, their value would be enhanced if the cities were grouped by metropolitan districts.

At present the Bureau of Labor Statistics series has only a one-third representation in the small incorporated cities, and none in the rural non-farm areas. Statewide reporting of certain minimum items on construction would provide not only more data, but would insure uniformity in the reports. Establishment of state reporting will depend to a considerable degree on an aroused public interest in housing problems, demanding zoning and building regulations beyond corporate city limits.

The reporting of farm construction would be a desirable addition to the whole body of current construction statistics. In the absence of country-wide reporting, which will extend to farms, separate data should be compiled for farms, preferably by the Department of Agriculture. This department already has an elaborate system of reporting farm data on a sampling basis which might be adapted to the item of construction.

Supplementary to any system of reporting current construction there is a growing need for the establishment of a periodic census of all real property. Census data on non-farm homes have been of the most limited and inadequate character and are available only on an irregular basis for certain 10-year intervals when obtained incidentally to the population census. During the past several years, physical inventories have been taken of the urban residential property in something more than 100 towns and cities, which aggregate about 15 per cent of the country's population, but these inventories have not been uniform in items covered. A census of real property covering the entire country at intervals not to exceed five years would provide a valuable background for correcting estimates made from incomplete data available currently. Such a census of the country's structures might desirably include items covering the size of the structure, materials of construction, date of construction, the rental value and market value as reported by the owner or occupant.

Since a large part of the country's wealth is represented by structures, and since the construction industry constitutes a major part of business activity it is clear that public agencies, both local and national, should take a more active part in the provision of factual information in this field.

THE EFFECT OF ALLOCATION OF NONRESIDENT DEATHS ON DEATH RATES*

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A DEATH RATE may be defined briefly as the ratio of the number of people dying to the number of people exposed to the risk of dying. Other demographic and economic data, such as those relating to business volume, unemployment, crime, fertility, etc., may also be expressed on a per capita basis. An essential requirement for the validity of these measures is that the data included in the numerator of the ratio be collected in a manner consistent with the population base used in the denominator.

One of the greatest difficulties in obtaining such correspondence arises from the fact that the population under investigation is not static. There is a rapidly increasing tendency toward population mobility, and this has now reached the stage where many rates and other per capita measures are of limited value unless nonresident factors are considered. In addition to more constant migratory trends, there are definite seasonal shifts in population due to climatic or occupational factors. Superimposed on these are more irregular changes in population such as those created by rapidly changing economic conditions in any particular locality.

In the case of mortality and natality data the greatest shifts are those caused by temporary migration into certain localities, especially cities, in order to take advantage of hospital facilities. For this reason the deaths reported for a particular city or county include decedents who are not residents of that city or county, and are, consequently, not represented in the estimate of the number of persons exposed to the risk of dying. On the other hand, the reported deaths for a specific locality fail to include residents of that locality who have died elsewhere. A solution of this difficulty obviously requires that nonresident decedents be reallocated to their place of residence.

The Bureau of the Census was well aware of the importance of this problem as early as 1900. The first of the annual volumes, *Mortality Statistics*, published in 1906, contains a rather complete discussion of the nonresident problem and also of the difficulties of making adequate correction for this factor. However, it was not until 1918 that a table based on a reallocation of nonresidents was published. At that time the

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mortality registration area did not include all of the United States, and consequently the reallocation could not be complete. A similar table was published for each consecutive year up to 1931, when the nonresident tabulations were discontinued.[1]

In 1935 the Division of Vital Statistics inaugurated a new series of nonresident tabulations. The coding rules by which the reallocation is made are of primary importance in the consideration of such tabulations. The essential rules are given below:

ESSENTIAL RULES FOR ALLOCATING RESIDENTS

1. A decedent is a nonresident if the place of residence is stated as different from the place of death.
2. Decedents living more than 1 year in a community are residents.
3. Decedents in general hospitals, tuberculosis sanatoria, etc., are allocated to original place of residence.
4. Decedents in "mental" institutions, etc., are tabulated as residents of place of death.

These instructions are based on the general principle that the place of residence should be determined so that the mortality data correspond with the enumerated populations on which rates would be based. They are, of course, subject to criticism from certain points of view, and subject to future revision. But in the meantime, the effect of each on the tabulations should not be overlooked.

In coding the place of residence, the decedent is considered as a resident of his "usual place of abode." If no place of residence is given on the death certificate, the decedent must be considered as a resident of the place of death. Such omissions of original data reduce the number of nonresidents which are tabulated.

The second rule states that if a decedent has lived more than one year in a community he is considered a resident of that community even though some other place of residence is stated on the death certificate. This does not mean that a person must live a whole year in one place before he can be considered a resident. As soon as his usual place of abode is established, the person becomes a resident of that place. The third rule refers to persons moving temporarily to hospitals, and similar institutions where the length of stay is not usually of long duration. Tuberculosis sanatoria are included in this group of hospitals, because even though the length of stay may be long, the cause of death presumably originated at the place of former residence. The effect of the fourth rule must be emphasized. This rule states that decedents

[1] Certain State Departments of Health make nonresidence tabulations. The first of these were published by the Connecticut and New York Departments of Health in 1927. According to the latest information available, eleven states now make a rather complete residence tabulation. Eight other states make a partial residence tabulation by showing deaths for cities and counties including and excluding nonresidents.

in institutions where the length of stay is usually long are tabulated as residents of the place of death. This applies to inmates of state mental hospitals, penitentiaries, homes for the poor and aged, etc. In order to keep mortality tabulations consistent with population figures, it is necessary to assign deaths in such institutions to the city or county in which the institution is located. However, such deaths are tabulated separately so that it is possible to obtain mortality figures for each county and city including or excluding deaths in these institutions.

The data presented in the following discussion refer only to the seventeen states for which tabulations have been completed, and to the

TABLE I

TOTAL DEATHS AND DEATHS OF OUT-OF-STATE NONRESIDENTS: 1935

State	Total deaths	Out-of-state nonresidents	
		Number	Per cent of total deaths
Total	346,719	8,825	2.5
District of Columbia	8,483	800	9.4
Florida	20,046	1,339	6.7
Arizona	6,077	334	5.5
New Hampshire	6,532	327	5.0
Minnesota	26,247	893	3.4
Utah	5,066	162	3.2
Maryland	21,182	621	2.9
Delaware	3,208	91	2.8
Vermont	4,777	131	2.7
Rhode Island	7,838	199	2.5
Montana	6,291	153	2.4
New Jersey	43,284	963	2.2
Connecticut	17,659	372	2.1
Washington	18,203	337	1.9
Massachusetts	50,237	885	1.8
Maine	11,024	186	1.7
Indiana	39,515	471	1.2
Michigan	51,050	561	1.1

District of Columbia.[2] It is important to emphasize that these results are provisional. Until tabulations for all states are completed, it is not possible to include for any state deaths of residents of that state occurring in other states.

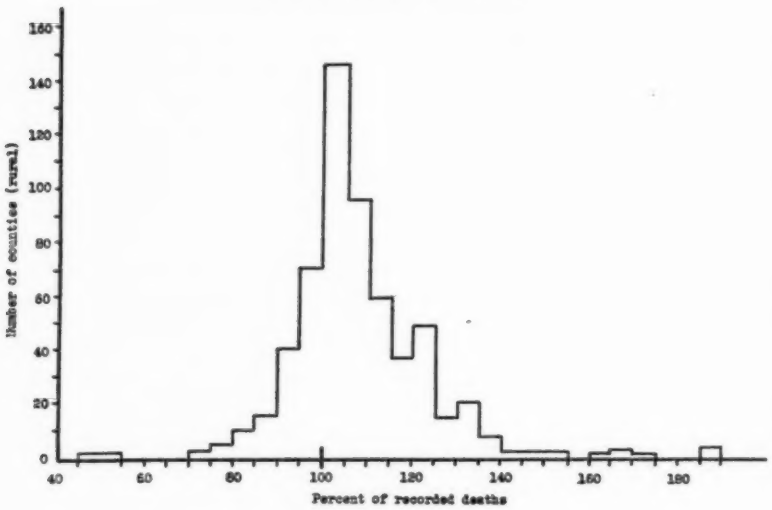
Some idea of the numerical importance of these out-of-state residents can be obtained by determining how many out of those dying in each state were residents of other states. These data are given for each state in Table I. Florida, for example, reported 20,046 deaths in 1935. Of these 1,339, or 6.7 per cent, were residents of other states. Such states as Michigan or Indiana had very few out-of-state nonresident deaths. In all of the 18 areas under consideration here, there were 346,719 deaths, and of these 8,825, or 2.5 per cent, were residents of a state other than that in which death occurred.

[2] The areas included are listed in Table I.

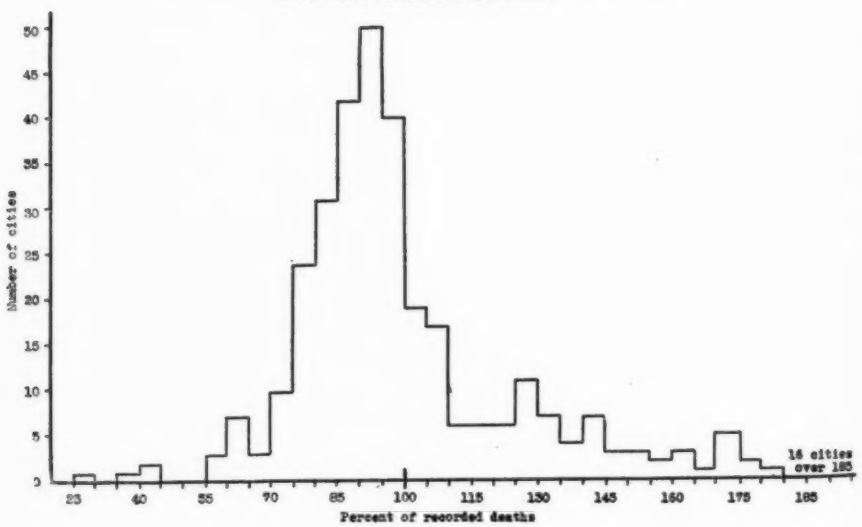
CHART I

NONRESIDENT MORTALITY IN 18 STATES: 1935

Distribution - Percent resident deaths are of recorded deaths in rural counties (out-of-state residents not included).



Distribution - Percent resident deaths are of recorded deaths in cities (out-of-state residents not included).



From the above figures it is easy to see that interstate migration, as reflected in mortality returns, is so great that the allocation of these nonresidents to the proper state is essential. This is not, however, as important as the reallocation of all nonresidents, including those who have merely moved about within a state.

In almost every discussion of the mortality nonresident problem, it is assumed that this movement within and between states consists largely of persons leaving the rural parts of counties and going to cities. Thus, it is frequently stated, that the recorded death rate is excessively high for cities and too low for the rural parts of the counties. This is generally the case but there are many exceptions.

Chart I shows the frequency distribution of the percentages that the resident deaths are of the recorded deaths for rural parts of counties. If the percentage is over 100 it means that the resident rate would be higher than the recorded rate. From this distribution it is easy to see that the recorded rate for most counties is too low, but it is important to notice that in one-fourth of the counties the recorded rate is too high. In these counties more people move into the rural part of the county to die, than move out of it.

The opposite side of the picture is also shown in Chart I. The lower graph shows the frequency distribution of percentages that the resident deaths are of the recorded deaths for cities of over 10,000 population. Here most of the percentages are less than 100, indicating that the resident death rates for those cities are less than the recorded death rates. But notice also that in over 35 per cent of the cities the reverse is true.

These distributions show that it is oversimplification to visualize the migration entirely as one from rural areas to metropolitan areas, and that it is necessary to consider the shifts from cities to rural areas, the shifts from one rural area to another, and the shifts from one city to another.

Irrespective of the direction of these movements, it is evident that the movement into a city or county seldom equals the movement out of that city or county, and that the error neglected when no allocation is made, varies greatly from city to city and from county to county.

But the importance of a study of nonresidence goes further than an examination of the net effect of reallocation. If a large number of people move into a city to die and another large number move out of the city to die, the net effect on the death rate for that city may be zero. However, this would merely be a coincidence of minor importance. The people that move out of a city go for reasons that differ from those who move into a city, and whatever the net effect on the crude death

rate may be, the migration is a social phenomenon worthy of serious study.

Without attempting, therefore, to balance the nonresidents of any locality against the residents of that locality who die elsewhere, an examination can be made of the magnitude and characteristics of the group of nonresidents per se.

The total number of deaths recorded in each state and the number of decedents who were not residents of the tabulation unit[3] in which death occurred, is shown in Table II. In New Jersey, for example, 20.9 per

TABLE II

NUMBER OF DEATHS OF PERSONS WHO ARE NOT RESIDENTS OF THE TABULATION UNIT IN WHICH DEATH OCCURRED: 1935

State	Total nonresidents	
	Number	Per cent of total deaths
Total	46,502	13.4
New Jersey	9,032	20.9
Rhode Island	1,459	18.6
Connecticut	2,834	16.0
Massachusetts	7,742	15.4
Minnesota	3,899	14.9
Florida	2,900	14.5
Utah	700	13.8
New Hampshire	887	13.6
Washington	2,454	13.5
Montana	847	13.5
Michigan	6,375	12.5
Delaware	390	12.2
Maryland	2,146	10.1
Maine	1,085	9.8
District of Columbia	800	9.4
Vermont	387	8.1
Arizona	387	6.4
Indiana	2,178	5.5

cent of the decedents died in a city or a county in which they were not residents. Even in states which had the fewest nonresident deaths, more than 5 per cent of the recorded deaths were nonresidents. For the total area under investigation 13.4 per cent of the recorded deaths were of those not residents of the tabulation unit in which death occurred. This high percentage may be taken as an indication of the general amount of error which is neglected when no resident reallocation is made. However, the error for individual cities or counties may be far in excess of this.

It has generally been assumed that the nonresident group consisted largely of those moving to hospitals or other institutions, and dying from certain causes. While it was not practical to make a tabulation

[3] The tabulated number of nonresidents is definitely related to the size of the tabulation unit. If there is a single code number for a whole county it will not be possible to identify changes of residence within a county. In census tabulations of this material each city of 10,000 or over, and each county, exclusive of the cities, is considered a tabulation unit.

which shows the detailed distribution of causes of death for the nonresidents, they have been tabulated in six important cause groups.

TABLE III

NUMBER OF DEATHS FROM CERTAIN CAUSES AND THE PROPORTION THAT ARE NONRESIDENTS: 18 STATES, 1935

Cause	All decedents	Nonresident decedents	Per cent nonresidents are of all decedents
Total	346,719	46,502	13.4
Tuberculosis	15,819	3,487	22.0
Cancer	38,167	5,360	14.0
Puerperal	2,649	603	22.8
Diseases of infancy	11,856	1,609	13.6
Total automobile	9,008	3,147	34.9
All other	269,220	32,296	12.0

These are shown in Table III. This table shows the number of deaths in each of the six cause groups for the total decedents, as well as the number of deaths for the nonresident decedents. The table gives also the percentage of those dying from each cause who were nonresidents. The proportion for each cause may be compared with that of the total. Thus, whereas 13.4 per cent of all decedents were nonresidents, 22.0 per cent of those dying from tuberculosis were nonresidents. It is also evident that in the case of cancer and diseases of infancy, the proportion of nonresidents is practically the same as for total deaths. The greatest percentage among these selected causes is for deaths resulting from automobile accidents. Of these, 34.9 per cent were not residents of the place of death.

The extent to which hospitalization is related to nonresidence is also of interest. Table IV shows the number of all decedents and the number of nonresident decedents dying in hospitals. The percentage of each group dying in hospitals is shown in the last two columns. For the total decedents 34.8 per cent die in hospitals, whereas in the nonresident group the percentage is 80.0.

TABLE IV

NUMBER AND PERCENTAGE OF TOTAL AND NONRESIDENT DECEDENTS DYING IN URBAN AND RURAL HOSPITALS: 18 STATES, 1935

Place of death	Number		Per cent	
	All decedents	Nonresident decedents	All decedents	Nonresident decedents
Total	346,719	46,502	100.0	100.0
Hospital	120,557	37,222	34.8	80.0
Not hospital	226,162	9,280	65.2	20.0
Total urban	205,819	32,948	100.0	100.0
Hospital	95,239	28,706	46.3	87.1
Not hospital	110,580	4,242	53.7	12.9
Total rural	140,900	13,554	100.0	100.0
Hospital	25,318	8,516	18.0	62.8
Not hospital	115,582	5,038	82.0	37.2

Needless to say, the proportions in these tables vary widely from state to state, and from rural areas to urban areas. But for every area, whether a study is being made of general mortality or of special causes, it is evident that a consideration of the nonresident group is of paramount importance.

Granting the importance of this, it does not follow that all mortality tabulations should henceforth be made on the basis of place of residence rather than place of death. Whenever such a change is made, it will create a discontinuity in the comparability of mortality statistics. Consequently, it is necessary to have a transition period during which mortality data are tabluated both by place of residence and place of death. In view of this necessity the Bureau of the Census plans to continue its tabulations based on place of death, and to supplement these with more complete tabulations based on place of residence. During the Decennial Census of 1940, it also plans, if possible, to investigate the effect of such a change upon the commonly used specific death rates. At this time a complete population base for such rates will be available. Such a study would form the necessary connecting link between the present "place of death" tabulations and the future "place of residence" tabulations.

THE ATHENS MEETING OF THE INTERNATIONAL STATISTICAL INSTITUTE

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ON THE invitation of the Government of Greece, extended at London in 1934, the International Statistical Institute held at Athens, September 27 to October 1, 1936, its twenty-third meeting, and the ninth since 1923, when the series began again after an interruption of ten years. At each session the General Assembly, or whole body of members, breaks up into not more than four sections, dealing respectively (at Athens) with demography, economic statistics, social statistics, and mathematical methods. The bulk of the work is done in the sections where (1) communications from members which have been printed and mailed in advance of the session are examined, usually after a summary explanation by the writer, and (2) reports of committees, which also have been circulated beforehand are discussed, leading in many cases to recommendations by the section to the General Assembly. Towards the end of the week, the General Assembly considers and usually adopts these recommendations. At Athens, departing from recent Institute procedure, the statistics of distribution or business, the recent developments of which are of especial interest, was considered by the General Assembly on the basis of a committee report without preliminary examination in a section.

The session received eight communications and five reports on problems in demography, nine communications and four reports on problems in economic statistics, ten communications and four reports on problems in social statistics, and five communications and two reports on problems in mathematical methodology, a total of 32 communications and 15 reports. The communications will be disregarded for lack of space, but action on the leading section recommendations calls for a summary.

Regarding *census methods in the Far East*, the General Assembly advised: that methods should be prescribed in detail by the central government; that there should be a preliminary count of dwellings; that the census should be made by enumerators carefully selected, instructed, and supervised; that the schedules should carry only demographic questions; that, if no census can be taken, an estimate of the population should be made by the representative method under a uniform plan; and that all results should be tabulated at a central office.

Regarding *death rates at high ages*, it recommended: that in censuses and registration reports particular attention should be given to returns about persons over 70 years of age; and declared that, although it could not recommend as suitable for all conditions any single method of computing such death rates, the method of graphic adjustment deserved particular consideration.

Regarding the *statistics of the number and proportion of still-born*, it recommended: that each country should adopt whatever methods seem most appropriate for getting complete statistics of births; that the definition of stillbirths proposed by the League of Nations should be adopted; that all returns of stillbirths should be accompanied by explanations about causes of error; that the deaths of those dying under 1 year of age should be classified according to age by days within the first week, by weeks within the rest of the first month, and by months within the rest of the first year; and that, regarding the figures most helpful in analyzing the statistics of living births, stillbirths, and death rates by age in the first year of life, a decision should be delayed pending further examination by the committee.

Regarding *deaths and death rates from cancer in large cities*, it recommended: that the committee's inquiry should be repeated at the time of the next census, avoiding the causes of error revealed by this preliminary investigation; that the Hygiene Section of the League of Nations and other international medical organizations should be asked to help in drafting a schedule to be filled by physicians in hospitals about each first treatment of a case of cancer and, if possible, another schedule about the outcome of the case; and that all schedules should be tabulated in a central office.

Regarding *statistics of economic cycles*, it asked its committee to prepare a further report on the index numbers which have been or should be used in order to give a correct idea of the meanings of the phrase, "economic equilibrium," as set forth in the report, and to send its questionnaire to organizations studying economic cycles or concerned with economic studies, and it urged the Director of the Institute's Permanent Office to continue, in cooperation with the Conference of Economic Services, to publish indices of economic activity for 16 important countries.

Regarding the *international statistics of motor power*, as motor power constitutes an essential element of production, as the employment of secondary motors calls for care in determining accurately the amount of power available for each branch of industry, and as it is important not to confuse motor power, as an index of capacity, with energy pro-

duced or consumed, as an index of production, the General Assembly recommended: that the statistics of motor power used in transportation (not including transportation within establishments) should be classified as follows: (a) road transportation, (b) railway transportation, (c) transportation by water, (d) transportation by air; that with reference to automobiles the statistics should indicate whether the power is reported according to some conventional measure or is the power actually produced; that the statistics should report: (a) power from different kinds of prime motors and subdivide each, distinguishing motors in use, even if unemployed at the moment, from motors in reserve or used only under special circumstances; and (b) the power of different kinds of secondary motors; that, to facilitate computation of the motor power available for each branch of industry, it is well to distinguish (a) the power of prime motors used for producing electricity from the power used for other purposes; (b) the electric power bought outside from the power produced within; that, as a measure of the power available for each branch of the industry, it is well to use (a) the power of prime motors not employed for producing electricity plus the power of electric motors, or (b) the power of prime motors plus the power of electric motors fed by purchased current minus the power sold; and that the power should be reduced to kilowatts according to a specified formula.

Regarding the *statistics of traffic accidents*, noting that a sub-committee of the League of Nations had proposed a schedule for such statistics and thinking that it does not ask for several items of information needed for international comparison, especially about proper bases for the statistics, such as population, number of vehicles used, amount of gasoline consumed, it invited the Committee on the Statistics of Transportation to consider this and other statistical questions relative to the use of accident reports, and confirmed the reference of such statistics to that committee.

Regarding *family budgets* a preliminary report and two communications were referred back to the committee.

Regarding the *organization of government statistics*, a preliminary report and a communication were discussed, and the section urged to continue the study and divide the field.

Regarding *criminal statistics*, the mixed commission's report upon the objectives, including an outline of a model report, was approved.

To deal with *international statistics of new buildings and of housing*, it was decided to set up a new committee and to ask the Bureau to enlist the cooperation of the Hygiene Section and the Economic Sec-

tion of the League of Nations, the International Labor Office, the International Union of Cities, the International Federation for Town Planning, and the International Building Association.

Regarding the *statistics of gymnastic and sport societies*, it urged statistical offices to include this subject in their reports.

Regarding the *statistics of the use of radios*, as the radio has become increasingly important in social life, as all such returns as are internationally comparable should be gathered and as the Institute appreciates what the International Union on the Use of the Radio has done, especially from an international point of view, and thinks that the work should be extended, it asked the Bureau to get into touch with the International Union on the Use of the Radio and propose the establishment of a mixed commission to determine the objectives for developing international radio statistics.

Regarding *mathematical methods*, it invited the attention of statisticians to the objections to an inference often drawn in using the Bravais-Galton coefficient "*r*" as a measure of correlation and approved a series of recommendations regarding the form of statistical tables.

One privileged as I have been to attend both pre-war and post-war sessions notes certain differences between them. Until recently the Institute was substantially a child of Europe. All but one of its fourteen pre-war sessions as well as the nine sessions of its predecessor, the International Statistical Congress, were held in that continent, and the comparative failure of the one held outside Europe sounded a warning against a repetition of the experiment. The early post-war meetings at Brussels and Rome carried on this pre-war tradition, but since 1925 and apparently not of set purpose the Institute has become a world organization with sessions at Cairo, 1927, Tokyo, 1930, Mexico, 1933, and one in prospect in Washington, as well as at Warsaw, 1929, Madrid, 1931, London, 1934, and Athens, 1936.

The attendance and the quality of the communications, reports, and discussions at these sessions held outside of Europe have been on a par with those at the European sessions. This has been due almost entirely to the fact that the organization committees for the Cairo, Tokyo, and Mexico sessions, supported by their governments, were able to pay either the cost or at least the additional cost of the longer journeys.

There has been also since the War a material extension of social functions connected with the gatherings. On comparing three pre-war with three post-war sessions, it appeared that the Berlin session, 1903, arranged for an excursion to Wannsee and a banquet there; the Lon-

don session, 1905, for a reception at a country house and an excursion to visit Windsor Palace; and the Paris session, 1909, for a half-day's excursion to Chantilly and a day's trip to Rouen.

At Tokyo, 1930, on the other hand, during the week there was a day's excursion to Nikko and, after the business sessions had ended, five days of excursions to Hakone, Kioto, Shiga, Nara, and Osaka; at Madrid, 1931, there was a midweek trip to Toledo, and after the sessions members and guests were entertained for two days by the city government of Barcelona; and finally at Mexico, 1933, after the sessions, there were eight days of excursions, mainly in autos, to Xochimilco, Taxco, Cuernavaca, Toluca and its volcano, Nevado, the pyramids of Teotihuacan, San Rafael, Amecameca, Pachuca, Real del Monte, and El Chico.

At the London session of 1934, although no such excursions were arranged, many members, accepting invitations from Dublin, attended the celebration of the Statistical and Social Inquiry Society of Ireland, which immediately followed the meeting in London and which, with accompanying governmental functions, filled several days.

Delightful as these opportunities have been to see a country's wonders under expert guidance, in the company of friends, and without expense, it is a question which the Institute, perhaps on recommendation of the Bureau, might consider, whether it would not conduce to improving the Institute's work if bounds were set to the generous and charming hospitality of the local committee of arrangements.

As at previous sessions the social functions at Athens were varied and brilliant. Their unique feature was that we felt, as perhaps on no earlier occasion, that we were seeing for the first time the ancient home of our civilization, for we are all the children of Hellas. On Sunday we visited the Acropolis under the leadership of the Director and participated in a tea given by the Premier and Minister for Foreign Affairs. On Monday there was an excursion to the Marathon reservoir, where luncheon was served, and a dinner by the Minister of National Economy; on Tuesday a visit to the Greek Exhibition and a dinner by the Mayor of Athens.

For Thursday evening a society of Greek ladies had organized an exhibition of Greek costumes and dances of many periods and regions; on Friday there was an excursion in motors to Delphi; on Saturday, a visit to the National Museum and in the evening a presentation of Sophocles's *Electra* in modern Greek in the theater of Herod Atticus on the side of the Acropolis. That afternoon also the members of the Bureau were received by the King.

To American members, at least, the Athens session was noteworthy because this was the first time in 80 years and the first among 32 meetings of the Institute and its predecessor, the International Statistical Congress, in which as many American members attended as appeared from any other country. Those present were Davis R. Dewey and wife, E. Dana Durand, wife and daughter, Haven Emerson, Irving Fisher, Joseph A. Hill, William F. Ogburn, Karl Pribram and wife, Stuart A. Rice, Carl Snyder, William M. Steuart and wife, Walter F. Willcox and sister; and three guests, Dr. Halbert L. Dunn, Miss Elizabeth C. Tandy, and Miss Jessamine S. Whitney. Before the War the average attendance of American members at sessions in Europe was less than two per meeting; since the War and excluding the Mexico and Athens meetings, for which traveling expenses were paid, their average attendance was two per meeting. At Mexico five and at Athens eleven were present.

NOTES

AUTOMATIC CHECKS IN CORRELATION ANALYSIS

The purpose of this note is the presentation in systematic form of a series of "automatic" or "mechanical" checks upon all of the basic statistical operations of multivariate analysis, from the sums of the original series, as they are to be used in the analysis, up to *and including* all the simple intercorrelations. No checks are suggested for the operations of "deflation" or elimination of seasonal or secular variation. It is assumed that the data are accurately presented in whatever form it is desired to correlate them.

No algebraic contribution is contained in this note. None of these checks is in any proper sense original. It is believed, however, that not all of them have ever been combined into a single tabular system, and the evidence is clear that competent statisticians are today using checks which are at the same time more complex and less satisfactory because these have not been called to their attention.[1]

Consider a set of N observations on each of n variables x_1, x_2, $x_3, \cdots, x_n$, $(N>n)$.

Let Σ denote summation over all of the N observations. (Thus there will be N terms in Σx_4, in $\Sigma x_2 x_5$, etc.)

Let S denote summation over all possible *permutations* of the indicated literal subscripts. (Thus $S(\Sigma x_i) = \Sigma x_1 + \Sigma x_2 + \cdots + \Sigma x_n$, i taking all values from 1 to n. Also $S(\Sigma x_i x_j) = \Sigma x_1^2 + \Sigma x_2^2 + \cdots + \Sigma x_n^2 + 2\Sigma x_1 x_2 + 2\Sigma x_1 x_3 + \cdots + 2\Sigma x_{n-1} x_n$, i and j taking in turn all values from 1 to n.) However, $\underset{i<j}{S}(\Sigma x_i x_j)$ will exclude all the sumsquares and half the summed cross products.

We require also a sumvariate $x_s (= x_1 + x_2 + \cdots + x_n)$ obtained by summing all of the n variables for each observation. Thus there are N "observations" of x_s.

The following definitions are expressed in terms familiar to all, and require no explanation.

$$M_{x_i} = \frac{\Sigma x_i}{N}\,;\quad M_{x_i^2} = \frac{\Sigma x_i^2}{N}\,;\quad \sigma_i^2 = \frac{\Sigma x_i^2}{N} - \left(\frac{\Sigma x_i}{N}\right)^2;\quad M_{x_i x_j} = \frac{\Sigma x_i x_j}{N}\,;$$

$$p_{ij} = \frac{\Sigma x_i x_j}{N} - \frac{\Sigma x_i}{N}\cdot\frac{\Sigma x_j}{N}\,;\quad r_{ij} = \frac{P_{ij}}{\sigma_i \sigma_j}\,;\quad p_{ii} = \sigma_i^2\,.$$

[1] Checks similar to several of those here presented may be found scattered through the literature of correlation method. See, for example, Mordecai Ezekiel, *Methods of Correlation Analysis*, Wiley & Sons, New York, 1930, pp. 539 ff., and Ragnar Frisch, *Statistical Confluence Analysis by Means of Complete Regression Systems*, Universitetets Økonomiske Institutt, Oslo, 1934, pp. 12 ff.

We are now ready to set up two tables, the first of n rows and nine columns; the second of ${}_nC_2$ rows and five columns.

TABLE I

Column Number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Column Content	Σx_i	Σx_i^2	M_{x_i}	$M_{x_i}{}^2$	$M^2{}_{x_i}$	σ_i^2 $=(4)-(5)$	σ_i $=\sqrt{(6)}$	$\dfrac{p_{i1}+p_{i2}+\cdots+p_{in}}{\sigma_i}$	$\sigma_i(r_{i1}+r_{i2}+\cdots+r_{in})$
x_1									
x_2									
.									
.									
.									
x_n									
Column Totals	$S(\Sigma x_i)$	$S(\Sigma x_i^2)$	$S(M_{x_i})$	$S(M_{x_i}{}^2)$	$S(M^2{}_{x_i})$	$S(\sigma_i^2)$	$S(\sigma_i)$	$S(p_{ij}/\sigma_i)$	$S(\sigma_i r_{ij})$
x_s	Σx_s	$\Sigma x_s{}^2$	M_{x_s}	$M_{x_s}{}^2$	$M^2{}_{x_s}$	$\sigma_s{}^2$			

Columns (8) and (9) of Table I will be explained after Table II has been constructed. At the foot of Table I the penultimate row contains the sums of the n quantities in each column. The last row is obtained by treating the sumvariate x_s exactly as was each of the n variates in the body of the table.[2]

TABLE II

Column Number	(10)	(11)	(12)	(13)	(14)	(15)
Column Content	$\Sigma x_i x_j$	$M_{x_i x_j}$	$M_{x_i} M_{x_j}$	$p_{ij}=(11)-(12)$	$\sigma_i \sigma_j$	$r_{ij}=(13)\div(14)$
x_1x_2						
x_1x_3						
.						
.						
x_1x_n						
x_2x_3						
.						
.						
x_2x_n						
.						
.						
$x_{n-1}x_n$						
Column Totals	$S_{i<j}(\Sigma x_i x_j)$	$S_{i<j}(M_{x_i x_j})$	$S_{i<j}(M_{x_i} M_{x_j})$	$S_{i<j}(p_{ij})$	$S_{i<j}(\sigma_i \sigma_j)$	

[2] Since the computations upon the sumvariate add nothing to our knowledge of the original set of variables under analysis, the best checking procedure would seem to be that which provides an adequate verification of all work, yet minimizes the number of operations performed upon the sumvariate. Here we require only the N sums x_s, the N squares $x_s{}^2$, and the six operations indicated at the foot of the

Columns (8) and (9) are set up solely to check column (15). For the first entry in column (8), the sum of all the product-moment coefficients having one as either subscript, including $p_{11}=\sigma_1^2$, must be found, and this total divided by σ_1. Similarly the second entry is computed by summing all the p's having a two as either subscript, including $p_{22}=\sigma_2^2$, and dividing this sum by σ_2, etc.

For the first entry in column (9), the sum of all simple correlation coefficients having one as either subscript, including $r_{11}=1$, must be found, and this total multiplied by σ_1. Similarly the second entry is computed by summing all the r's having two as either subscript, including $r_{22}=1$, and multiplying this sum by σ_2, etc.[3]

It follows therefore that the sum of column (8) is simply $S(p_{ij}/\sigma_i)$ and that of (9) simply $S(\sigma_i r_{ij})$.

The following "automatic" checks will verify every entry in each table. (In these checks [a] will denote "the sum of column (a).")

I	Σx_s	=	[1]
II	Σx_s^2	=	[2]+2[10]
III	M_{x_s}	=	[3]
IV	[4]	=	$(1/N)$[2]
V	$M_{x_s^2}$	=	[4]+2[11]
VI	$M^2_{x_s}$	=	[5]+2[12]
VII	σ_s^2	=	[6]+2[13]
VIII	[11]	=	[12]+[13]
IX	$[7]^2$	=	[6]+2[14]
X	[8]	=	[9] (Checks column 15)

The following suggestions as to order of procedure will be found helpful in using these tables and checks. Fill in all of the spaces in one column before proceeding to the next column.

Fill in column (1) and apply check I.

Fill in columns (2) and (10) and apply check II.

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first six columns of Table I. Ezekiel's checks (op. cit.), which incidentally do not verify the zero order correlations, require in addition the Nn multiplications necessary to obtain Σx_1x_s, Σx_2x_s, $\cdots$, Σx_nx_s. Frisch (op. cit., p. 12) declares against the calculation of these n additional product-sums, but on the following page calls for the calculation of quantities s_{is} by his equation (1.9) which can only mean, in our notation, obtaining $N\Sigma x_ix_s-\Sigma x_i\Sigma x_s$ for each i from 1 to n.

[3] The use of the zero order correlations in the determination of multiple regression or correlation constants by means of modifications of the familiar "Doolittle Solution" has been discussed recently by F. V. Waugh, "A Simplified Method of Determining Multiple Regression Constants," this *Journal* Vol. XXX, December, 1935, pp. 694–700, and also by A. K. Kurtz, "The Use of the Doolittle Method in Obtaining Related Multiple Correlation Coefficients," *Psychometrika*, Vol. I, March 1936, pp. 45–51. These and similar systematic solutions contain a "sum and check" column at the right, in which are placed the sums $r_{i1}+r_{i2}+\cdots+r_{in}$ of the coefficients which enter into each of the normal equations. In computing the entries in column (9) Table I of this paper, all of these sums are obtained. Consequently the *additional* labor involved in checking column (15) is even less, when a Doolittle solution is the next operation.

Fill in columns (3) and (4) and apply checks III and IV.
Fill in columns (11), (12) and (5) and apply checks V and VI.
Fill in columns (6) and (13) and apply checks VII and VIII.
Fill in columns (7) and (14) and apply check IX.
Fill in columns (15), (8) and (9) and apply check X.

VERIFICATION OF THE CHECKS

The proofs of these checks involve only the most elementary algebra and will be familiar to most readers. However, their presentation is greatly simplified by the use of the summation notation here employed, and they are given to make this note completely self-contained.

By definition, $x_s = x_1 + x_2 + \cdots + x_n$, whence

$$\Sigma x_s = S(\Sigma x_i) . \qquad \text{I}$$

Obviously $\Sigma x_s^2 = S(\Sigma x_i x_j)$; but

$$S(\Sigma x_i x_j) = S(\Sigma x_i^2) + 2\underset{i<j}{S}(\Sigma x_i x_j) . \qquad \text{II}$$

If we divide both sides of the equation of check I by the number of observations, we have

$$M_{x_s} = S(M_{x_i}) . \qquad \text{III}$$

Since the sum of the means is the mean of the sums, we have

$$S(M_{x_i}^2) = \frac{S(\Sigma x_i^2)}{N} . \qquad \text{IV}$$

Continuing the use of this same notation,

$$\begin{aligned} M_{x_s}^2 = (1/N)\Sigma x_s^2 = (1/N)S(\Sigma x_i x_j) &= S(M_{x_i x_j}) \\ &= S(M_{x_i}^2) + 2\underset{i<j}{S}(M_{x_i x_j}) . \end{aligned} \qquad \text{V}$$

And likewise,

$$M^2{}_{x_s} = S(M_{x_i} M_{x_j}) = S(M^2{}_{x_i}) + 2\underset{i<j}{S}(M_{x_i} M_{x_j}) . \qquad \text{VI}$$

By definition,

$$\sigma_s^2 = M_{x_s}^2 - M^2{}_{x_s} = S(M_{x_i x_j}) - S(M_{x_i} M_{x_j})$$

or

$$\begin{aligned} \sigma_s^2 &= S(M_{x_i}^2) - S(M^2{}_{x_i}) + 2\underset{i<j}{S}(M_{x_i x_j}) - 2\underset{i<j}{S}(M_{x_i} M_{x_j}) \\ &= S(\sigma_i^2) + 2\underset{i<j}{S}(p_{ij}) . \end{aligned} \qquad \text{VII}$$

Since the sum of the differences is the difference of the sums, we have

$$\underset{i<j}{S}(p_{ij}) = \underset{i<j}{S}(M_{z_iz_j}) - \underset{i<j}{S}(M_{z_i}M_{z_j}) . \qquad \text{VIII}$$

Expanding,

$$\{S(\sigma_i)\}^2 = S(\sigma_i\sigma_j) = S(\sigma_i^2) + 2\underset{i<j}{S}(\sigma_i\sigma_j) . \qquad \text{IX}$$

Finally,

$$S\left(\frac{p_{ij}}{\sigma_i}\right) = S\left(\sigma_j\frac{p_{ij}}{\sigma_i\sigma_j}\right) = S(\sigma_j r_{ij}) .$$

Since $r_{ij}=r_{ji}$,

$$S(\sigma_j r_{ij}) = S(\sigma_i r_{ij}) . \qquad \text{X}$$

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THE ANALYSIS OF INTERNAL MIGRATION IN THE SWEDISH CENSUS OF 1930

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In view of the possibility that a question on internal migration may be included in the schedule for the United States census in 1940, it is appropriate to examine the Swedish experience in incorporating such a question in their 1930 census schedule.[1]

Up to the time of the 1930 census, Swedish official interest in internal migration was confined to two sorts of analyses:

(1) A yearly record of migrants to and from each community, summarized and published for larger administrative areas, and used in conjunction with records of births and deaths to compute the population as of the last day of every calendar year. In this analysis migrants have been classified by sex and internal migrants separated from immigrants and emigrants, but no breakdown by age or other demographic characteristics, or by direction of migration has been possible.

(2) A decennial analysis of the resident population in terms of birthplace. These data have been analyzed in considerable detail in the census reports since 1860, and throw light on the general direction of the main migration streams and the amount of population redistribution, but have proved to be quite unsatisfactory for any analysis of the dynamics of migration or the characteristics of the migrants at the time of migration.

By 1930, a general appreciation of the importance of internal migration, of what was felt to be its profound effects not only on the economic development of the country but also on the trends of nativity and mortality, and a widespread impression that the fundamental nature of these migrations was changing rapidly led to the inclusion of a special question in the census schedule relating to the *date of last migration into the community of present residence and the name of the community of residence immediately preceding this migration.*

METHOD OF DATA COLLECTION AND PLAN OF TABULATION

The 1930 census followed the tradition of all preceding censuses since 1860, in being primarily an *indirect* census, i.e., a balance sheet drawn from the continuous population registers whereby the status of the

[1] Sveriges Officiella Statistik: Folkräkningen, den 31 december 1930. II. Bygdeindelning. Folkmängden efter ålder, kön och civilstånd. Inrikes omflyttning (inkl. fördelning efter födelseort) Stockholm, 1936.

resident population on the last day of the decade is indicated. This indirect approach was, as usual, supplemented by a number of questions on the tax declaration schedule required of every householder (to be filled in for all the members of his household) covering points not included in or not readily obtained from the population registers. The collation of these two records provided the basic data for the census.

The population registers had one serious limitation in providing the complete information called for by this question. Although the registration form has one column for the date of migration into the community and another for the name of the community of previous residence, the latter is usually filled in only for persons migrating into the community during the period for which a particular set of registers is set up. The registers are renewed every ten years, following the census, and in the transcript of the "survivors" from the old ledger (persons who have neither migrated from the community nor died), a folio reference to the old ledger is usually given instead of the name of the community of previous residence. In the census of 1930, persons migrating into a community between January 1, 1921, and December 30, 1930, could be identified[2] in the current register in terms of the community of previous residence, but in-migrants during the (preceding decade could be so identified only by tracing back a folio reference to the preceding register, and the tracing of in-migrants of several decades ago, through a series of registers, would have involved an impossible clerical burden. For this reason, an especial effort was made to obtain the required data with reasonable accuracy for all persons whose last migration to the community of present residence occurred between 1921 and 1930, and the main tabulations are based on this limited period. A still further limitation to the years 1926–1930 was considered necessary for analyzing age and occupations because these data refer to status, as of December 31, 1930, and not to status at the time of the last migration.

The tabular and analytical framework is geographical, and an understanding of the types of areas used is essential to an appreciation of the meaning of the results. The smallest administrative unit is the *community*, of which there are about 2500; 118 of these communities have received royal charters as *towns;* the others are called *rural areas*,

[2] The tracing was a difficult matter even for a number of the migrants of 1921–1930 for the registers are usually organized on an address basis. Persons moving frequently *within* the community may be shifted from folio to folio in the same volume with the same trouble of identification of community of preceding residence as if they had migrated into the community during a preceding decade. This difficulty is eliminated in Stockholm, but only since 1926, when a card system was so organized that an individual's whole record is shifted from one address to another.

irrespective of their size. The communities are grouped together, for certain local governmental and administrative purposes, into 288 *districts* (härad), and the districts, in turn, are grouped into 24 *counties* (län) plus the city of Stockholm.

The community is the unit for population registration, hence, internal migration means inter-community changes of residence. The county is the most usual tabulation unit, each county being divided into rural areas and towns. Tabulations were formerly made in terms of districts also, but this unit was discontinued in the primary population tables in 1920, presumably for reasons of economy.

In the present census, the heterogeneity of the county was recognized, and a non-administrative unit, the *region*, (bygd) was used to assemble and even to cut across district lines, if the classification could thereby be improved, but never to cut across county lines. Thus the comparability of the data with past censuses was preserved and at the same time more significant differentiation was made possible. The criteria (which are not described in the census volumes published to date) are said to be those of economic geography. The regions number 132.[3]

RESULTS

The main results, as analyzed in the census volume, may be summarized briefly, as follows:

1. *Origin and Destination of Migrants:* Half of those whose last migrations occurred between 1921 and 1930 moved from one rural area to another. When the number of migrants from each area is expressed as a proportion per thousand mean population 1921–1930, the following results emerge:

		0/00 mean population I (rural areas)		
		Males	Females	Total
I	Migrated from one rural area to another	190	197	193
	Migrated from rural area to town	74	99	87
	Total migrated from rural areas	264	296	280
		0/00 mean population II (towns)		
		Males	Females	Total
II	Migrated from town to rural area	122	132	127
	Migrated from one town to another	105	116	111
	Total migrated from towns	227	248	238

[3] Four of the regions include one large city each; 84 include both rural areas and one or more towns and 44 include only rural areas. In one case the region includes one whole county; in 24 cases one whole district; 4 cases, as indicated, one whole city; in 41 cases it cuts across district lines; and the remaining 62 regions comprise 2 or more whole districts each.

It should be noted that the proportions are consistently higher for rural areas than for towns and for females than for males.

When the data are thrown into regional classes, migrations from one rural area to another are found to be predominantly intra-regional (short distances) whereas migrations between towns are predominantly inter-county (long distances).

2. *Areas of Absorption and Dispersion:* By comparing in- and out-migrants to and from different regions, areas of absorption and dispersion are determined. Although towns in general would be expected to be absorption areas, 35 of 88 town regions show losses and are, by definition, dispersion areas and, if intraregional migrants are excluded, no less than 58 are dispersion areas. This is probably due to the drawing power of the largest cities over other towns. As expected, most rural regions are areas of dispersion: Only 16 out of 128 are absorption areas, if all moves are taken into account and, if intra-regional moves are excluded, a total of 25 rural regions become absorption areas.

Each region is analyzed for its contacts with other regions in detail separately for each sex to show the 8 regions from which it draws the greatest number of in-migrants, and the 8 to which it sends the greatest number of out-migrants. From this tabulation, one can determine the steps in the migration process: Stockholm, the metropolis, is the direct goal for migrants from many regions; from other regions, the migrations proceed in shorter stages toward the same eventual goal. Stockholm is the area of absorption for its inner suburban region, the latter is an absorption area for the outer suburban region and the coastal region, and this last is, in turn, an area of absorption for its neighboring regions.

The general demography of rural dispersion and absorption areas is examined to throw light on some of the possible demographic effects of migration. This analysis embraces the 16 rural absorption areas subdivided into "suburban areas" and "other rural areas," compared with 21 rural areas where the dispersion amounted to at least 60 0/00 of the mean population. It covers the following main points:

(a) The extent to which rural communities are "agglomerated" (agglomerated means that at least two-thirds of the population lives around a compact, village-like center).
(b) Proportion of agricultural workers and their dependents to total population.
(c) Age distribution.
(d) Sex ratio.
(e) Married women aged 15–45 per 1000 inhabitants.

(f) Birth rate and married fertility rate
(g) Death rate.

Striking differences between absorption and dispersion areas are shown in regard to all of these factors, absorption areas being highly agglomerated, having low proportions of agricultural workers, high proportions of young adults, high proportions of females, high proportions of married women, a somewhat high birth rate, low married fertility, and low death rate compared with dispersion areas.[4]

The movement of population is, in general from areas of high fertility to those of lower.

(3) *Duration of Residence:* The data are analyzed by year of in-migration. At the time of the census one-third of all migrants (including those migrating before 1921) had lived in the community of present residence less than five years and one-half less than ten years. The nature of the question asked on the schedule makes for a tendency toward decrease in the number of migrants from the census date backward due to death and repeated migration.

(4) *Age and Occupation of Migrants:* As indicated above, this analysis was limited to persons whose last migration occurred between 1926 and 1930.

The age analysis is made in considerable detail with a warning that the average age-displacement in the data amounts to two years. Important differences are shown between areas of absorption and dispersion the latter, on the average, drawing younger migrants than the former due chiefly to the influx of agricultural labor to dispersion areas.

CRITIQUE

The 1930 Swedish census approach to internal migrations represents an improvement on the usual approach in terms of place of birth and place of residence, for the latter always seems to imply that the first migration from the place of birth leads to settlement, and that a cross section analysis at any point of time will indicate the streams of migra-

[4] The main specific results were, in brief, as follows:

		Rural absorption areas	Rural dispersion areas
Agglomerated population	0/00 population	520	186
Agricultural workers and dependents	0/00 population	283	502
Ages 15–30	0/00 males	275	263
	0/00 females	261	232
Females per thousand males (Ages 15–30)		928	850
Married women aged 15–45 per thousand population		111	99
Birth rate (1929–1932)		15.9	15.6
Marriage fertility rate (1929–1932)		117.5	135.2
Death rate (1929–1932)		11.1	12.7

tion. It cannot, by its very nature, take account of migrants returning to their birthplaces, or of migrants whose present residence is but one of a series of moves. The present analysis, being confined to the last migration, cuts across this series at various points and probably gives a more realistic picture of the process of migration, since the community of destination (present residence) can in all cases be tied up with the community where the last migration originated (previous residence).

The best aspects of the analysis are undoubtedly those which relate migrations to economic geographical structure on a regional basis and permit an empirical definition of areas of absorption and dispersion. The demographic differences found in these regions are enlightening, and the close relationship between mobility on the other hand and nativity and mortality on the other is strongly indicated. This analysis also enables an approach to be made to the selective aspects of migration, in which the variables of distance and community structure play an important role.

The analysis is, however, handicapped throughout by one serious defect inherent in the data, i.e., that the migrants for every year included differ from those for every other year. The migrants for 1930 give a pretty complete representation of the migration process for that year, the only exclusions being the migrations of those who migrated and died during the same year and the preceding migrations of those who migrated two or more times during the year. But 1929 excludes one other group, i.e., those who migrated again in 1930; 1928 excludes those who migrated again in 1929 and 1930, etc. In other words, the further from the census date, the greater the selection of "migration survivors." The strength of this selection is indicated by the following table, where migrants for each year from 1921 to 1930 are expressed as a percentage of the total for the ten years.

Year of in-migration	Per cent of all in-migrants	Year of in-migration	Per cent of all in-migrants
1930	21.7	1924	7.6
1929	14.5	1923	6.9
1928	11.6	1922	5.6
1927	9.9	1921	5.2
1926	8.8		
1925	8.2	Total	100.0

It is obvious that, even allowing for the influence of secular trend and cyclical variations in the number of migrants, and in their mortality repetition of migration has had an enormous influence in reducing the numbers included in all years except the last.

To solve this difficulty it would be necessary to obtain a complete cross-section of migrants for a sufficiently large number of years to allow for the influence of trends and cycles, or a longitudinal record of the successive steps in the migration history of a sufficiently large number of individuals. Neither of these approaches can reasonably be considered appropriate as a census procedure.

Recognizing the limitations of the question as phrased in the Swedish census, what is a possible alternative? The question generally proposed for use in the 1940 United States Census is of the general form. "Where did you reside at the time of the 1930 census?" Its most obvious advantage is the relative ease with which the data could be tabulated. Time is held constant, and the tabulations would easily fall into the form of the place-of-birth—place-of-residence analyses. A picture of the general shifts in population distribution would result, but nothing would be known about the time at which migration occurred. Migrants returning to their previous place of residence would not enter the record, and no trace would be left of the migrations originating and terminating during the years intervening between 1930 and 1940.

Accepting the necessary limitations, both of the question used in the Swedish Census and this proposed question for the United States Census, one further point becomes important: "Which of these questions is likely to produce the most reliable answers?" The Swedish experience throws no light on this point, for the census was not taken by direct questioning, and the defects in the data were due entirely to the form in which the population registers are kept. A preliminary experiment with both forms of questions would definitely be worth while to determine whether people in general can give more reliable information about their last place of residence and the date of the change of residence or about their place of residence at a given point of time.

It will be important to be able to depend on the data that are obtained, for, even with the limitations noted, the inclusion of a question on internal migrations in the census schedule is likely to be the only systematic approach to this problem that we can hope for in the near future.

MOVEMENTS OF MAIL-ORDER PRICES

Sales of mail-order houses constitute a substantial proportion of the total volume of retail trade in the United States. Much of the buying of farmers, in particular, is done through the large mail-order companies. Yet none of the index numbers by means of which we trace changes in the average prices paid by final consumers includes mail order quotations. If the movements of mail-order prices differ from those of the price series used in constructing current index numbers of retail prices, these index numbers may not be accepted as accurate measures of changes in prices paid by consumers at large.

Some light is cast on these matters by index numbers constructed from selling prices in the catalogs of Sears, Roebuck and Company over the period 1923–1936.[1] Comparable price quotations on 210 articles are available for the period 1929–1936. For the period 1923–1929 quotations on 145 articles are available. Since the records for the earlier period are less comprehensive, the price movements of the two periods are shown separately in the following table. The index numbers are unweighted geometric averages of relative prices.

Comparison with other measurements of price changes over these periods reveals a number of interesting differences. From 1923 to 1929 the mail-order prices included in the above index numbers declined, at a rate markedly greater than those prevailing among wholesale and retail prices in general. From 1929 to 1933 there was no great divergence of the different index

[1] The quotations have been secured through the courtesy of Mr. D. M. Nelson, Vice President of Sears, Roebuck and Company, in charge of Merchandising. Mr. Nelson states that the prices given relate to items "in which the selling price can be compared from year to year with a reasonable degree of accuracy because of the similarity of the items in the years covered. There has been no substantial change in quality in the items included in this list."

The commodities on which quotations are given for the period 1929–1936 include:

Commodity	Series	Commodity	Series
Cotton piece goods	19	Farm equipment, appliances	13
Cotton towels	4	Farm equipment, incubators and brooders	4
Cotton blankets	2	Farm equipment, fencing, etc.	12
Cotton underwear	8	Furniture	14
Cotton work shirts	5		
Cotton overalls and pants	9	Floor covering, wool	8
		Floor covering, felt base	5
Silk piece goods	8		
Silk hosiery	2	Electric appliances	8
		Household furnishings	8
Rayon piece goods	2		
Rayon lingerie	7	Leather, shoes	10
		Leather, harness	10
Linen piece goods, etc.	4		
		Rubber, footwear	8
		Rubber, automobile tires and tubes	10
Woolen blankets	1	Rubber, garden hose and belting	3
Woolen underwear	4		
Woolen men's clothing	5	Stoves and heaters	8
Enamelware	9	Total	210

numbers. Mail-order prices rose sharply from the spring of 1933 to the spring of 1934, paralleling and in some cases exceeding the general rise. Thereafter, to the fall of 1936, during a period of general advance in both wholesale and retail prices, the mail-order series here represented showed an average decline of 11 per cent.

INDEX NUMBERS OF MAIL-ORDER PRICES
FALL 1923–FALL 1936
(BASED UPON SEARS, ROEBUCK AND CO. PRICE QUOTATIONS)

Catalog	*Fall 1923 = 100*				
	All commodities (145 series)	Textiles (55 series)	Furniture and furnishings (43 series)	Farm equipment (20 series)	Other (27 series)
Fall 1923	100.0	100.0	100.0	100.0	100.0
Fall 1924	95.6	99.0	91.9	93.7	96.9
Fall 1925	92.3	94.3	88.0	92.0	96.1
Fall 1926	89.7	89.0	84.1	88.7	102.1
Fall 1927	83.3	80.7	80.8	86.1	91.1
Fall 1928	81.9	81.3	74.9	84.8	93.1
Fall 1929	81.6	80.5	75.8	92.5	86.1
Catalog	*Fall 1929 = 100*				
	All commodities (210 series)	Textiles (80 series)	Furniture and furnishings (60 series)	Farm equipment (29 series)	Other (41 series)
Fall 1929	100.0	100.0	100.0	100.0	100.0
Fall 1930	94.7	90.5	98.8	93.1	98.2
Fall 1931	85.5	78.4	91.9	88.6	88.8
Fall 1932	72.3	61.8	80.5	79.9	78.1
Spring 1933	71.1	59.3	77.6	79.4	77.0
Fall 1933	77.1	69.7	83.4	82.1	80.4
Spring 1934	84.6	80.3	89.2	86.3	85.2
Fall 1934	79.5	78.5	80.3	87.9	74.7
Spring 1935	73.8	67.6	75.2	83.7	74.7
Fall 1935	75.9	71.9	76.0	87.3	75.1
Spring 1936	75.0	67.9	79.5	85.6	74.7
Fall 1936	75.4	68.2	77.5	87.5	79.1

No other series of index numbers is strictly comparable with the mail-order measurements given above. The data are of exceptional interest, however, for they represent a highly important market not covered in the compilations currently available to students of prices. Since their movements appear to differ from those of prices in the markets represented in existing retail price indexes, there is the more reason for seeking to extend mail-order price records, and to utilize them to the full.

FREDERICK C. MILLS

National Bureau of Economic Research

IMPROVEMENT OF GOVERNMENT PERSONNEL

A session on problems connected with securing better personnel in the Government service was held under the joint auspices of the American Statistical Association, the American Economic Association, and the American Farm Economic Association at the convention meetings in Chicago. The report of the Commission of Inquiry on Public Service Personnel[1] invited the various professional associations to continue the study and discussion of the program it had outlined. It was in response to this invitation that the program was arranged. Papers were presented by Professor William E. Mosher, Director of the School of Citizenship and Public Affairs of Syracuse University; Professor Leonard D. White, Civil Service Commissioner; and Dr. Isador Lubin, Commissioner of Labor Statistics.

Professor Mosher's paper, entitled "A Critique of Federal Personnel Policy as Applied to Professional Social Science Positions," discussed the emphasis which still exists in the Civil Service Commission on a negative policy of maintaining bulwarks against political raids. Professor Mosher urged the necessity for supplementing this program with an aggressive recruitment system which would acquaint desirable applicants with the attractive opportunities for research work in the Government. He also discussed the need for improving both the written and unassembled examinations of applicants through greater emphasis on quality rather than quantity of experience, through fuller application forms, and through requiring applicants thoroughly to substantiate their claims of professional experience instead of being given the benefit of the doubt when sketchy statements are submitted.

Professor Mosher complimented the Commission on encouraging the development of a program of "career service" in the Federal Government. Such a program must of necessity involve close cooperation between appointing agencies and the Commission, and points directly to the Commission's need for a larger staff of highly competent persons.

Commissioner White, who came to the Civil Service Commission from the Political Science Faculty of the University of Chicago, in a paper entitled "New Opportunities for Economists and Statisticians in Federal Employment" discussed the extraordinary growth in the number of positions filled by economists and statisticians in the Federal service since the beginning of the century. He noted that classified and unclassified positions may be of three main types: those primarily research in character, advisory or part-time positions, and those primarily administrative but requiring a broad knowledge of the social sciences. Many of these positions, he pointed out, afford ample opportunities for trained economists and statisticians in numerous salary ranges. He explained that the Commission holds written

[1] *Better Government Personnel*, McGraw-Hill Book Co., New York, 1935. A summary of the report appeared in the June, 1935, issue of this JOURNAL.

examinations in the social science fields as a rule only in the lower salary brackets, whereas those in the higher salary ranges usually consist of the so-called "unassembled examinations" in which the applicant presents a detailed sworn statement regarding his education and professional experience. He made clear that the Civil Service Commission recognized the recruitment problems outlined by Professor Mosher and that efforts are being made to attract highly competent people and to emphasize quality of education and experience in their examinations.

"Government Employment as a Professional Career in Economics" was discussed by Commissioner Lubin, of the Bureau of Labor Statistics. Despite the belief in certain circles that Government positions are accepted only as a last resort, Dr. Lubin stated that actually a condition almost opposite to this has often developed. He pointed out that colleges and universities have suffered an embarrassing drain on their faculties during the recent exodus of social scientists into the Federal service. Dr. Lubin noted that during the last twenty years many highly competent research organizations have developed in a number of the bureaus. He gave it as his opinion that the research carried on in these agencies is usually of at least as high a caliber as that obtaining in academic circles and that the pressures on academic freedom are probably no greater than those exerted in university circles by department heads, presidents, the state legislature and the press. He called attention to the abundant opportunity for independent research in close contact with vast sources of basic data and with other persons interested in research problems, and to the fact that Government salaries compare favorably with those in colleges and universities.

DONALD C. RILEY

Central Statistical Board

PROGRESS OF WORK IN THE CENSUS BUREAU

PRESENT STATUS OF WORK ON POPULATION ESTIMATES

For the first nine months of the year 1936 there were two men in the Population Division working on the technical problems of making population estimates for states and cities on the basis of available local data. Fairly satisfactory estimates of the population of states on July 1, 1934 and 1935, were worked out on the basis of school enrollment figures and other local data, supplemented by the 1935 farm population data obtained from the farm census. Work was begun on making estimates for cities. Local information was collected for a considerable number of cities and much was done toward establishing a standard method for using such information. Estimates of the 1935 population of the United States distributed by age and sex were practically completed. In September both of these men resigned and the Census Bureau has not yet succeeded in filling their places. So at present very little progress is being made on the more difficult problem of estimating population for cities.

The estimates of the total population of the United States, which are based on registered births and deaths and immigration data, are being made as usual, as soon as the basic figures become available. The United States estimate for July 1, 1936, was tentatively distributed by states, mainly on the basis of the distribution for 1935, and these state estimates were released on October 28, 1936. Estimates for January 1 of the years 1930 to 1936 were issued on January 21, 1937, the State figures being for the most part interpolations from the July 1 estimates. A release giving estimates of the population by age and sex as of April 1, 1935, was given out in February.

CHANGE IN THE WEEKLY HEALTH INDEX

The lack of current or recent population estimates for cities has led to a change in the form and content of the *Weekly Health Index*. The presentation of death rates, which, in the lack of any better basis, has heretofore been based upon the population estimates of 1933, will be discontinued. The *Index* will present the actual number of deaths, including for purposes of comparison the number in the preceding week; also the average number for the corresponding week in the preceding three years; also the accumulated total of deaths up to date in the current year and the corresponding total for the preceding year. Thus the *Index* in its present form is well adapted for showing the trend in individual cities, enabling one to compare deaths in the current week with the 3-year average and to see at a glance by how much the number of deaths since the beginning of the year is running above or below that for the corresponding period of the preceding year. It does not, it is true, permit a comparison of one city with another as regards the death rate. But death rates based on dubious population estimates are, of course, unreliable and often very misleading. In presenting actual numbers only,

the *Index* will show facts as they are and will tend to prevent wrong conclusions.

Similar changes have been made in the *Summary of Mortality from Automobile Accidents*. The rates have been discontinued and numbers only are shown.

PHOTOGRAPHING CENSUS RECORDS

The Bureau of the Census has recently installed an elaborate apparatus for photographing census records. It includes two cameras which were specially constructed to photograph the population schedules in bound volumes without removing the sheets from their bindings. The ribbon films used in these cameras, though only 35 millimeters wide, can be easily read by use of magnifying projectors, forty of which have been installed for this purpose. The cameras are just now being used for photographing the population schedules of the census of 1840 which are bound in 273 volumes, giving the names of heads of families with a classification of the population by age, sex, and color. There are two other cameras which are designed for photographing loose sheets.

Other cameras of a standard type, such as used by banks and business houses, have been purchased, and will be first used for photographing the index cards of the census of 1900. They may be used lated for photographing birth and death certificates. The film is only 16 millimeters in width but can be enlarged and read on the same projectors as are used for the wider films.

There are over 20,000 volumes of population schedules, covering every census from 1790 to 1930 inclusive, except the census of 1890 for which the schedules were destroyed or badly damaged by fire. A floor space of 16,000 square feet is required to store these volumes arranged on shelves so as to be readily accessible. As reproduced on films they could all be kept in file cases conveniently accessible in the room occupied by the writer, in which the floor space—20×17 feet—is hardly more than 2 per cent of that required for storing the bound volumes.

In addition to the saving in storage space there are other advantages secured by having the schedules photographed. The original documents will be preserved from the wear and tear of frequent handling; and the existence of duplicate records on safety (non-inflammable) films will be an added precaution against loss by fire or water.

THE CARD INDEX FOR THE 1900 CENSUS

The Bureau of the Census, as announced in a previous issue of the JOURNAL (December, 1935), is making a card index of the population enumerated in the census of 1900. An average of about 2,500 persons, taken from the relief rolls, have been employed in St. Louis on this work since September, 1935. The transcription of the data from the population schedules to the cards is now completed, and the cards are being indexed by the Russell Soundex system. The index is completed for 26 states and the District of Columbia, covering about 30 per cent of the 76,000,000 people living in

continental United States in 1900. The cards, one or more for each family, are indexed under the name of the head of the family and give the name, relationship to the head of the family (wife, son, etc.), date of birth (month and year), age in years, and birthplace (state or country), of every member of the family, including boarders and lodgers. The total number of cards is about 32,000,000.

LIFE TABLES

The United States Life Tables for 1930 have now been published in an octavo cloth-bound volume of 57 pages containing 28 tables and three pages of introductory text.[1] It includes three sets of tables based on the population census of 1930 and on deaths for 1929 to 1931. One set covers all continental United States; another is limited to the registration states of 1920; and a third covers the original registration states. The last two sets make it possible to compare the tables for 1900, 1910, and 1920, previously published, with 1930 tables covering the same areas. In order to facilitate such comparisons, six of the tables contained in the volume of Life Tables prepared by Dr. Glover and published by the Bureau of the Census in 1920 have been reproduced in the present volume. Another set of tables covers the period 1920 to 1929 and is based on the censuses of 1920 and 1930. Then there are tables covering the period 1919 to 1921 based on the census of 1920.

J. A. H.

A CORRECTION

In the article by Dr. Hugo Muench on "The Probability Distribution of Protection Test Results," this JOURNAL, 31 (1936), 677–690, change P to p on the seventh line of page 680 and the n's to s's in equation 16, page 685.

[1] The volume is on sale by the Superintendent of Documents, Washington, at the price of 75 cents.

STATISTICAL NEWS AND NOTES

DOMINION BUREAU OF STATISTICS, CANADA.—*1936 Census of the Prairie Provinces.* To date the Census Branch has published 19 bulletins in connection with the Census of the Prairie Provinces of June 1, 1936. Of these, 13 are on straight population, 3 on employment and unemployment, and 3 on agriculture. The coding for agriculture, housing, families, earnings, occupations, employment and unemployment has reached the half way mark.

As a result of experiments carried out by the mechanical staff of the Bureau, a new tabulator machine has been designed and tested and is now on the point of being put into operation. There is no practicable limit to the possibility of this machine in the number of cross-classifications which may be made. It contains 520 individual counters, 40 banks of adding machines and takes the standard commercial card of 45 columns of information at the rate of 325 per minute. It analyzes three-, four- and five-way combinations of data simultaneously and takes final aggregates of each class.

Census of 1931. Three further volumes of the Census of 1931, namely, Volume V—*Housing, Households, Families and Earnings*, Volume VII—*Occupations*, and Volume VIII—*Agriculture*, are now on press and are expected to be ready for distribution within the next few months.

The Social Analysis Branch. In close conjunction with the census, a Social Analysis Branch has been recently established in the Dominion Bureau of Statistics at Ottawa. Mr. M. C. MacLean, M.A., F.S.S., formerly Chief of the Education Statistics Branch, is Chief of Social Analysis and responsible for the organization and operation of the Branch. The nucleus of the organization is a research staff selected from the successful candidates for census-clerk positions in 1931 and 1936 on the bases of: (1) university record of standing and field of specialization; (2) oral interviews; and (3) short theses to test fitness for research and analysis.

The immediate project in hand is a series of census monographs, but other parallel functions fulfilled by the Branch are: general research into the best methods of selection and rejection of material and the best manner of compilation and presentation of future census data; methods of sampling to obtain reliable periodical figures of unemployment and to overcome bias in the case of incomplete returns; a method of computing an index of segregation for those sections of the population which tend to settle in "blocs" (there are indications that this index is inversely correlated with intermarriage and other manifestations of assimilation); and the best method of measuring the general emigration movement.

Classes on statistical method are held out of office hours and are attended voluntarily by about one hundred clerks.

Manufactures Branch. In an effort to bring the Bureau's classification of industries more in line with the recommendations of the Committee of Statistical Exports of the League of Nations, a revision of the present classi-

fication is now being made. The latest previous revision was undertaken in 1928.

Education Branch. A discussion between officials of the Dominion Bureau of Statistics and Provincial Deputy Ministers of Education took place in October, 1936, in connection with the biennial meeting of the Canadian Education Association. An agreement was reached on the uniform presentation of the financial statements of local school authorities and also of teaching personnel. The general improvement of statistics of pupils, and programs of study were subjects of resolutions passed at the meeting. The latest previous conference of this nature was held in 1920.

Mineral, Metallurgical and Chemical Branch. During October, 1936, discussion took place in London between the Dominion Statistician and representatives of the Imperial Institute, London, relative to the unification of mineral and metallurgical statistics of the British Empire. Progress has also been made in unification of the presentation of mineral statistics as between provinces of Canada and the Dominion.

Internal Trade Branch. In recent months the Bureau of Statistics has achieved definite progress in the improvement of the method of estimating "Invisible Items for the Canadian Balance of International Payments." This problem is made especially difficult in the case of Canada on account of the existence of large numbers of branch and subsidiary firms with head offices in other countries and whose long-term and short-term capital movements are complex. The classifications of purchases and sales of securities between Canada and other countries is another matter which has received attention, and ocean freight payments are now based on more comprehensive data, rates being applied to actual tonnages carried in British and foreign vessels.

Central Electric Stations. In a special study on electric power used in Canadian manufacturing and mining industries, the Bureau of Statistics correlated the increase in mechanical power and in man power so used for the period 1923 to 1934. This study has revealed a marked divergence of the power and employee index numbers, particularly subsequent to 1929 but also a more or less steadily increasing difference each year from 1923 to 1929; the power index was 48.3 points above the employee index in 1929 and 19.6 points above in 1934.

External Trade. The Bureau of Statistics has recently experienced difficulty in connection with the treatment of gold in trade statistics. Formerly exports were recorded as merchandise. When the Royal Mint began refining gold in Ottawa and gold began to be exported in the form of bullion, most of the gold production of Canada was recorded in the "Coin and Bullion Section." Latterly, after conferences between the Bank of Canada, the Department of National Revenue and the Bureau of Statistics, a policy has been developed whereby all gold bullion which goes out of the country as merchandise will be entered as such and will be recorded in total commodity exports. In consequence of this arrangement, Canada's exports of total trade have been revised from 1926 to date.

Institutional Statistics. The establishment of the Hollerith card system for the collection and compilation of statistical data of penitentiaries and tuberculosis institutions in Canada by the Institutional Statistics Branch of the Dominion Bureau of Statistics has made available much more detailed information on these subjects. The following publications are due to appear in 1937: (1) Annual Report on Mental Institutions, (2) Annual Report on Hospitals, (3) Annual Report on Penitentiaries, (4) Directory of Hospitals in Canada, (5) Quinquennial Report on Charitable and Benevolent Institutions, and (6) Quinquennial Report on Reformative and Corrective Institutions.

Finance Statistics Branch. The annual meeting of the Municipal Finance Officers Association of the United States and Canada was held in Toronto, Ontario, on September 9, 10 and 11, last. The Association is comprised of finance and accounting officers of state and local governments. Financial statisticians from the Bureau of the Census, at Washington, and the Dominion Bureau of Statistics, at Ottawa, attended the Conference on the invitation of the Executive Committee. The following resolution was adopted:

> RESOLVED That this Association recommend to the Bureau of Statistics of the Dominion Government, Ottawa, the calling together of a conference of representative Municipal Finance Officers from the different Provinces. The main purpose of such conference to be for the supplying of information in greater detail and with more uniformity for the citizens and officials of the Local and Provincial Governments and all other interests needing reliable and comparative municipal statistics.

A bulletin on the "Public Debt of Canada" has just been issued by the Finance Branch. The report gives a brief analysis of the debt of the Dominion Government and each of the Provincial Governments for the year 1935 and the total debt of all municipalities by provinces, at the close of 1934.

CENTRAL STATISTICAL BOARD.—The Central Statistical Committee and the Central Statistical Board have issued, under the powers conferred by its organic Act, the first of a series of regulations drafted to put on a formal and more effective basis the specification of schedules, questionnaires, and other materials relating to plans for statistical inquiries which should be reviewed by the Central Statistical Board. Although the Board is empowered under its Act to require the submission of material to it for review, it acts only in an advisory capacity in regard to the content of the material so submitted. Regulation No. 1, which has been circulated to the various agencies of the Federal Government, is as follows:

SUBMITTAL BY FEDERAL AGENCIES OF QUESTIONNAIRES AND OTHER MATERIAL TO THE CENTRAL STATISTICAL BOARD FOR REVIEW

PROMULGATED NOVEMBER 11, 1936

WHEREAS, it is necessary that the Central Statistical Board, established by Public, No. 219, Seventy-fourth Congress, approved July 25, 1935 (49 Stat. 498), be informed of plans for statistical inquiries in advance of the sending out of questionnaires, in order that unnecessary duplication and multiplication of questionnaires addressed to the same persons may be avoided, and in order that the Central Statistical Board and other interested agencies may be afforded an op-

portunity to offer suggestions regarding any proposed inquiry with a view to making the information collected more widely useful:

THEREFORE, pursuant to the authority vested in the Central Statistical Committee by section 5 (c) of Public, No. 219, Seventy-fourth Congress, hereinbefore cited, the Central Statistical Committee hereby prescribes that—

Definitions

1. (*a*) The term "questionnaire" as hereinafter used shall mean any form employed or to be employed by any agency of, or subject to the supervision of, the Federal Government, when such form incorporates a question or questions to be asked of several or many respondents or when such form provides for the original recording of answers to such question or questions.

(*b*) The term "general questionnaire" shall mean a questionnaire to be sent to 20 or more respondents, providing that (i) the respondents, in answering the said question or questions are not acting as employees or agents of the Federal Government, and provided that (ii) it is expected to make combined totals or averages from information obtained from the use of the said questionnaire.

(*c*) The term "restricted questionnaire" shall mean any questionnaire other than those specified under (*b*) above.

General Questionnaires

2. (*a*) Except in such cases as the Chairman of the Central Statistical Board or his duly authorized agent from time to time may specify in writing on his own motion or at the request of the interested agency, every proposed general questionnaire shall be submitted to the Central Statistical Board for review prior to adoption, and such submittal shall be early enough to allow the Board at least two working days for such review.

(*b*) In the case of a general questionnaire which is to be printed or otherwise multicopied, the term "adoption" shall mean the sending of copy to any office for duplication in a form to be disseminated to enumerators or respondents. In the case of a typewritten or other manuscript questionnaire, the term "adoption" shall mean submittal to the responsible officer of an agency for his approval of it for dissemination to enumerators or respondents.

(*c*) Any general questionnaire which is now in use or which shall hereafter be adopted and which shall continue in use currently without change for more than six months after adoption, shall, upon request of the Chairman of the Central Statistical Board or his duly authorized agent, be submitted or resubmitted to the Board for review.

Restricted Questionnaires

3. If the Chairman of the Central Statistical Board or his duly authorized agent shall make inquiry respecting any restricted questionnaire, and shall find that said questionnaire provides or might provide statistical information of general interest, said questionnaire shall on his written request be submitted to the Central Statistical Board for review.

Memorandum of Information

4. Each questionnaire submitted for review in accordance with paragraphs 2 or 3 shall be accompanied by a memorandum of information which shall set forth the purposes of such questionnaire, the methods and administrative ar-

rangements proposed for its use, the type or types and approximate number of the respondents, and any other information deemed by the submitting agency to be pertinent, and no questionnaire shall be deemed to have been submitted in accordance with this regulation unless accompanied by such memorandum.

Other Forms or Materials

5. Each agency submitting a questionnaire to the Central Statistical Board for review in accordance with the provisions of paragraphs 2 or 3, shall submit to the Central Statistical Board for review such forms, statements of instruction and other materials pertaining to the collection, tabulation, analysis, or publication of the data from said questionnaire as the Chairman of the Central Statistical Board or his duly authorized agent shall specifically request in writing.

Other Information

6. Each agency of, or subject to the supervision of, the Federal Government, shall, upon the request of the Chairman of the Central Statistical Board or his duly authorized agent, furnish any information in its possession which the said Chairman or his duly authorized agent may deem necessary to assist in the review of any questionnaire, form, statement of instruction, or other material submitted by such agency or by any other agency to the Board for review. No review of a questionnaire, form, statement of instruction or other material shall be deemed completed until after the submitting agency shall have furnished the information requested of it in accordance with this paragraph.

State and Local Public Finance News Letter. A second issue of the *News Letter* of the Board's Committee on State and Local Public Finance was released in January. This issue, in addition to presenting news items regarding state and local government finance and activities, outlines six possible major improvements that the executive subcommittee feels are needed in available data on activities of state and local governments. A limited number of copies of the second issue of the *News Letter* may be had without charge upon request to the Executive Secretary of the Central Statistical Board, Mr. Morris A. Copeland, 7028 Commerce Building, Washington, D. C.

Municipal Reference Library and Information Service. A Municipal Reference Library and Information Service is now in process of being established in the Federal Government. The library will be located in the Bureau of the Census, which will make the library facilities available to public officials and others and will act as an information bureau serving Federal, state, and local agencies. Among the new acquisitions to the library are selected current municipal documents which are being secured through the agency of the WPA Federal Writers' Project, from the 191 cities having over 50,000 population. The Bureau of the Census will catalog the documents and keep the library up to date with systematic additions. Federal agencies that have maintained temporary collections of municipal documents have suggested the possibility of transferring portions of their collections to the new library after it has been well established.

New Basis for Reporting Import Statistics. The Division of Foreign Trade Statistics of the Bureau of Foreign and Domestic Commerce has made a

cooperative agreement with the Department of the Treasury for reporting import statistics on a new basis. Prior to January 1, 1937, imports were shown from country of final invoice rather than from country of original production. Under the new arrangement, the import statistics will present the data by country of original production. For a time, while the new basis is being established, statistics will be presented both on the old and new bases for purposes of comparison.

BUREAU OF AGRICULTURAL ECONOMICS.—The Bureau of Agricultural Economics has inaugurated a new series of periodical commodity "situation" reports, designed to bring the respective annual outlook reports up to date. They contain a review of developments with respect to supply, demand and prices since the last previous report, and a revised statement of the outlook in the light of these developments. Important current statistics relating to the commodities also are included. The following tentative list indicates the commodities to be covered by the service. The figure in parenthesis following each title is the approximate date of publication, which may be varied to meet conditions as they arise. Unless otherwise noted, the reports are monthly.

1. Poultry and Egg Situation (8)
2. Wool Situation (9)
3. Fats and Oils Situation (10)
4. Sugar Situation (February 14; June 14; December 14)
5. Dairy Situation (16)
6. Demand and Price Situation for Farm Products (17)
7. Hog Situation (18)
8. Beef Cattle Situation (19)
9. Sheep and Lamb Situation (20)
10. Fruit and Vegetable Situation (21)
11. Wheat Situation—including rye (23)
12. Feed Crops Situation (March 25; August 25; December 25)
13. Cotton Situation (25)
14. Tobacco Situation (January 26; March 26; July 26; September 26)

There has been unusual interest in a report, recently issued by the Bureau of Agricultural Economics in cooperation with the New Jersey College of Agriculture and the Pennsylvania State College, on the organization, facilities and practices of the Philadelphia wholesale and jobbing markets for fresh fruits and vegetables. This report is an analysis of the present situation in these markets. In it the chief weaknesses on the markets are pointed out and suggestions are made for increasing marketing efficiency through reorganization and improvements in facilities and practices.

In reaching these conclusions a large volume of statistical material was collected. For an entire year records were made of receipts of fruits and vegetables by rail, truck, and boat at each of the four principal wholesale and jobbing markets and the chain store warehouses. For two sample periods

of two weeks each (one in the winter season and the other in summer) sales records were obtained from a representative number of dealers on each market in order to find out the area served by each market. This information showed in addition to the total volume of business transacted in each market throughout the year, the volume of such business received by rail, truck, and boat, the amount of cross-hauling among markets, the proportion of sales of each market going to chain stores, independent retailers in Philadelphia, and out-of-town buyers, and the extent to which the territory surrounding Philadelphia is dependent upon Philadelphia markets for its supplies of fruits and vegetables.

Nearly two hundred buyers in this area supplied by the Philadelphia markets were interviewed to find out the extent to which they are dependent upon the Philadelphia markets, and shift toward or away from Philadelphia in volume of business, their buying habits, time required for buying, suggestions for market improvement, etc. About the same number of growers in Pennsylvania and New Jersey were interviewed to find out their methods of selling, grading practices, markets used, comments on conditions in the Philadelphia markets together with suggestions for improvement. Similar contacts were made with retailers in Philadelphia as well as with wholesalers and jobbers actually selling in the markets of Philadelphia.

In studying the traffic problem in the markets where truck receipts are heavy and congestion is sometimes great, records were kept for several days of all trucks (separated into three groups: growers, buyers, and miscellaneous) arriving at the Dock and Callowhill Street markets between 6 P.M. and 9 A.M. together with the number of trucks in each classification standing in the markets each hour and a description of the traffic situation in every part of the market each hour. Actual time records were kept on approximately 75 growers' trucks and an equal number of buyers' trucks to note exactly how long they were in the markets and how the time was used.

After all the above data and much more additional information on general conditions and practices in the markets had been collected, an opportunity was given for all individuals or groups interested in the markets to express their views. Finally, after all the statistical material had been summarized and the opinions and suggestions recorded, the agencies making the study met for several days discussing the problems and drawing their conclusions. A committee representing car-lot receivers in Philadelphia has been appointed to study the report and to recommend to the trade such action as they think proper. Several meetings of farmers have been arranged in New Jersey and Pennsylvania to discuss the report.

At present the Bureau is collecting general information on the markets of 39 other cities.

The Division of Agricultural Finance is engaged in analyzing data for wheat, cotton, and corn, collected in connection with the Agricultural Adjustment Administration, to determine whether they might provide an actuarial basis for crop insurance. The analysis of data pertaining to wheat,

while not completed to date, provides the statistical basis for the recently published *Report of the President's Committee on Crop Insurance.*

Costs of indemnifying wheat losses have been determined in 210 counties. Data on identical individual farms cover the 6-year period 1930–35 inclusive. The study indicated that in certain areas there appears to be little relationship between the amount of insurance and the average annual indemnities required per acre, while in other areas it appears that the average annual cost of indemnifying losses is larger for those farms with the larger insurance coverage and smaller for those farms with the smaller insurance coverage. In other areas it is apparent that farms with higher coverage would require a smaller average annual indemnity per acre.

In order that excessive insurance would not be provided for the farm that has low average yields and that too limited coverage would not be provided for the farm that has high yields, it was decided that the amount of insurance on any farm would be some specified percentage of the average yield on that farm. The premium rate would be determined on the basis of two factors—the loss experience on the individual farm insured and the loss experience of the county or area, each factor being given equal weight. For the purpose of the study, the average annual indemnity per county was determined by getting the average indemnity for 75 farms for each year, weighting each indemnity by the wheat acreage planted on the farm. Finally the county average per acre indemnity for all 6 years was averaged without weighting. Acreage weights were not used in combining the 6 years because to do that would assume that in future years the same combination of high or low indemnities with large or small acreage would be repeated as occurred in the years 1930–35.

The Bureau of Agricultural Economics recently issued four reports in the machinery series for the Northern Great Plains and Pacific Northwest region. The purpose of the report on the "Cost of Operating Farm Motor Trucks on Grain Farms" is to show the extent to which farm motor trucks are used and what present owners, as well as prospective purchasers of motor trucks, can reasonably expect in the way of cost of using motor trucks on relatively large grain farms. The other publications in the series are:

1. Utilization of tractors and cost of tractor power on grain farms.
2. Utilization of combined harvester-threshers and cost of harvesting small grains with a combine.
3. Tillage, planting, and harvesting equipment on grain farms and rates of doing field work with these implements when drawn with horses and with tractor power.

Other recent publications of the Bureau are: *Cost of Production of Beets, Carrots, Cauliflower and Other Vegetables* which presents tables under each commodity showing cost data, acreage, and production or value of the crop by States; *Cost of Production of Tomatoes* which presents data from studies in 20 states for selected years, 1913–34; and *Cost of Production of Citrus*

Fruits which presents data pertaining to production by states, number of citrus trees in Arizona, Florida, and Texas, and cost data for California and Florida.

A monthly publication entitled *Foreign Agriculture* has been inaugurated by the Foreign Agricultural Service of the Bureau of Agricultural Economics. The first edition was issued dated January, 1937. *Foreign Agriculture* will include primarily articles which formerly appeared as feature stories in *Foreign Crops and Markets*. The field that will be covered by these articles will, in general, fall within three broad classifications: (1) foreign government policies relating to agriculture, (2) foreign agricultural production, and (3) international trade in agricultural products.

AGRICULTURAL ADJUSTMENT ADMINISTRATION.—A considerable volume of useful data is being compiled by the Agricultural Adjustment Administration in connection with the administration of agricultural conservation programs under the Soil Conservation and Domestic Allotment Act.

All farmers who expected to participate in the conservation program for 1936 were required to fill out a worksheet which showed the acreages of farm land and crop land, and estimated acreages in each of the several principal crops in 1935 for each farming unit. Altogether, well over 4,000,000 worksheets were submitted, and a worksheet was obtained for every farming unit in the ten states in the North Central Division—Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin.

In checking performance, the acreages in each base and in each of the several principal crops were either measured or estimated on every farm which applied for a grant under the program, so that even more accurate data have been obtained for 1936 than for 1935. Although every farm is not covered, the number of farmers cooperating in the program was large enough so that the ratios and relatives derived from these data should be of value in describing conditions or farm organizations actually existing in each state or region. In addition, a comparison of these performance data for 1936 with the worksheet data for 1935, or a comparison of the performance data which will be obtained for 1937 with those for 1936, should give a very accurate measure of changes in acreages on farms being worked by farmers cooperating with the Agricultural Adjustment Administration.

FEDERAL TRADE COMMISSION.—During November and December, 1936, and January, 1937, the Commission issued a series of reports on the textile industry for the last half of 1935: Part I dealing with cotton textiles, Part II woolen and worsted textiles, and Part III silk and rayon textiles.

These reports analyze the operating and financial data of the textile companies reporting to the Commission. For example, Part II shows labor costs, profits and investments of 258 woolen and worsted companies, the results for the last half of 1935 being compared with prior half-year periods back to January 1, 1933. A detailed analysis of operations per pound or square

yard of production is shown for those companies which manufacture only one of several general types of goods and which were able to supply quantity figures.

In addition to the above-mentioned series, a report on the cotton textile industry for the first half of 1936 has just been issued by the Commission. The report covers 580 cotton textile companies operating spindles of about 64 per cent of the total in place in the United States and looms of about 64½ per cent of the total in place, and presents statistical data similar in general character to those of the reports referred to above.

These textile reports, which follow the issue of several others in recent years, conclude the investigation conducted by the Commission pursuant to an Executive Order of September 26, 1934, and supplemental authorizations, the stated purpose of which was to show what effect increased wages and shorter hours might have on the textile industries.

The Commission's final report on the milk industry pursuant to a Congressional Resolution was made to Congress in January, 1937. This report based upon an investigation conducted in four important milk sheds and a study of the market regulations and the practices of distributors in four large cities, contains the Commission's conclusions and recommendations. An important recommendation is one with regard to the negotiation of State compacts relating to the production, sale, and distribution of milk and milk products, which concern the interests of two or more states but which do not exclusively involve interstate commerce.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE.—Several annual publications of statistical importance were made available during the first quarter of 1937 by the Bureau of Foreign and Domestic Commerce. Principally among these are the *Foreign Commerce Yearbook, 1936*, and *The Statistical Abstract of the United States, 1936*. Both of these publications were described in greater detail in the December issue of this JOURNAL.

A 1936 supplement to the *Survey of Current Business* was also released. This is the first time it has been possible to issue this supplement since 1932. The present volume makes corrections for interim changes and presents the statistical record by months for the years 1932 to 1935 inclusive, together with monthly averages, or annual indexes, back to 1913 where available. This volume is available at a cost of 35 cents from either the Government Printing Office or from the District Offices of the Bureau of Foreign and Domestic Commerce.

The Division of Economic Research has recently published a study, *Long Term Debts in the United States*. The principal topics covered are (1) changes in the volume of long-term indebtedness by principal classes of borrowers from 1912 to 1934; (2) changes in the annual interest charges on the several classes of long-term debt during this period; (3) the volume of obligations in default on different dates; (4) the comparative ages of the several classes of debt outstanding in 1933; and (5) the ownership of the evidences of debt as of a recent date. A special effort was made to compile and analyze the

information that will shed light on the adjustments that have taken place in the long-term debt structure during the depression years.

Recent publications of the Marketing Research Division include one on *Markets for Plumbing and Heating Facilities in Residences*. This volume, based upon information gathered in connection with the *Real Property Inventory* and which shows the unfilled market for the facilities analyzed, was made available late in January. The February 20th and 30th issues of *Domestic Commerce* carried the Bureau's estimates of wholesale and retail trade during 1936. A booklet on the lumber industry, presenting sources of detailed information, the names of Government agencies most closely allied to the industry, and a list, with addresses, of national and interstate trade associations, was released early in February.

The Market Data Section has under way at the present time, its annual study of retail credit conditions. Schedules have been mailed to cooperators asking for 1935 and 1936 data and indications are that the sample will be larger and more representative than in past years. Plans are also being formulated to revise *Market Research Sources* to appear early in 1938. All readers of the JOURNAL who have made or are making studies in the field of marketing should notify the Marketing Research Division, Bureau of Foreign and Domestic Commerce, of such studies for inclusion in this volume. The Bureau would appreciate any suggestions by JOURNAL readers of what new materials should be included.

A series of maps showing world production, consumption and principal trade movements of 33 various minerals in 1932, have been jointly prepared by the Bureau of Foreign and Domestic Commerce and the Bureau of Mines. These maps, which appeared in *Domestic Commerce*, have been reprinted and are available to readers of the JOURNAL.

Among the publications issued by the various commodity divisions of the Bureau is a series of processed booklets by the Foodstuffs Division which analyzes imports and exports in foods by commodity groups. The Automotive-Aeronautics Division issued, during January, two descriptive lists, one the *Highways of the World* and the other *Airlines of the World*, the latter of which is a comprehensive study of the principal companies, their addresses, routes from and frequency of mileage of flights. A map showing world airways is also included.

The Leather and Rubber Division, as a supplement to its *Leather Raw Materials* bulletin, has been publishing a series of articles under the general title, "International Trade in Goatskins." Articles published to date cover Trade of the United States, United Kingdom and Germany. These are to be followed by one on France, as well as a series covering the sources of this commodity. This same division expects to release during March a mimeographed survey of United States consumption and year end stocks of crude and reclaimed rubber.

The Division of Negro Affairs expects to make available shortly the results of its study which analyzed the contributing causes to failures among negro insurance companies.

The Tung Oil Blue Book has been issued by the Chemical Division of the Bureau. This volume presents the history, progress, and statistics of American production, the United States consumption and the world market situation relative to other drying oils.

The Specialties Division has recently published a bulletin on the *World Production and Trade in Sponges*, and a mimeographed release on the *Japanese Pottery Industries*. Both of these studies contain many statistical series. The pottery bulletin covers production, export and import trade, wages and hours of labor in the Japanese pottery industry and other factors of economic import.

U. S. BUREAU OF MINES.—Since 1909 a series of annual statistical surveys covering available supplies of secondary copper, lead, zinc, and other nonferrous metals has been published by the Federal Government—in the early years by the U. S. Geological Survey and since 1925 by the U. S. Bureau of Mines. Over nearly 30 years the figures on nonferrous secondary supplies have been constantly improved and now represent an important consideration in any study of the markets for these metals. No similar series of annual data has ever been developed for the important ferrous scrap. To fill this gap the Bureau of Mines hopes to maintain such a series, and the results of the first survey were released in December, 1936 (*Consumption of Ferrous Scrap and Pig Iron in the United States, 1935*, U. S. Bureau of Mines, Report Investigations, 3329, Mineral Economic Series 1); copies of this survey can be obtained by writing the Director, Bureau of Mines, Washington, D. C.

Following the suggestions of the Central Statistical Board, the Bureau of Mines and the Bureau of the Census collaborated in the conduct of a census of mines and quarries for 1935. The Bureau of Mines undertook the responsibility for the direction and guidance of the survey and additional staff were provided from the Census of Business. The usual questions of both Federal agencies were consolidated on a single schedule, and approximated as closely as practicable the most important items in the decennial census. These surveys are now being completed and some of the industry reports will be released in the early months of 1937.

In cooperation with the National Research Project of the Works Progress Administration the Bureau of Mines is conducting a survey of technological advances, productivity and employment in the mining industry for the period 1880 to the present.

DIVISION OF RESEARCH AND STATISTICS, BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM.—The Division of Research and Statistics of the Board of Governors of the Federal Reserve System is conducting a study of the turnover of various classes of deposits of weekly reporting member banks in 101 leading cities. The Division is also developing a method, which can be applied currently, of estimating adjusted demand deposits and time deposits for all nonmember banks in the United States on selected call report dates beginning in 1928. It is intended later to extend the series over earlier years.

DIVISION OF RESEARCH AND STATISTICS, U. S. TREASURY DEPARTMENT.—*Collections from Selected State-Imposed Taxes, 1930–36.* In connection with its studies of the types of taxes imposed by both the Federal and State governments, the Division of Research and Statistics of the United States Treasury Department prepared a compilation of collections from the following State-imposed taxes: Estate and inheritance, individual income, corporation income, gasoline, motor vehicle registrations and licenses, general sales, liquor, and tobacco. The report was released on November 30, 1936, as a publication of the Treasury Department. It presents State-by-State and summary data both on total collections and on the sharing of the revenue between the States and their political subdivisions. The data were obtained from officials of the various States and from published reports of State authorities.

Capital Movements. On November 27, 1936, the United States Treasury Department released a publication entitled "Statistics of Capital Movements between the United States and Foreign Countries and of Purchases and Sales of Foreign Exchange in the United States." The statistics presented in this publication cover the period from January 2, 1935, to September 30, 1936, and are arranged to show data both by weeks and by principal nations or geographical areas. The component elements of international capital and exchange transactions are set forth in some detail. There is also a group of Summary Tables, and graphic presentation of part of the summary data. The report was prepared in the Division of Research and Statistics on the basis of data reported weekly to the Treasury Department, pursuant to the Executive Order of January 15, 1934, and the Treasury Regulation of November 12, 1934. It is the intention of the Treasury to continue the publication of these statistics at quarterly intervals.

DIVISION OF ECONOMICS AND STATISTICS, FEDERAL HOUSING ADMINISTRATION.—A report embodying a series of estimates on housing construction during the years 1920–1936, with a forecast for 1937, has been completed. The study estimates the number and value of non-farm dwelling units built annually, 1920–1936, with breakdowns by the types of structures for the years 1926–1936. Over the 16-year period, the estimates indicate the total of non-farm units built annually throughout the country rising in a steep curve from the 1920 figure of 203,500 to the 1925 crest of 933,500, after which it tapers off gradually until the middle of 1928, when an abruptly declining curve sets in, extending almost unbroken to the low point of 53,100 in 1934, and rising again to the 1936 total of 270,500.

For the year 1937, it is estimated that between 400,000 and 450,000 nonfarm dwelling units will be built. This figure is somewhat less than the 1929 estimated production of 500,000 units, and is equal to, or slightly greater than, the 1921 estimate of 400,000 units. The 1937 forecast is more likely to err as an under-statement rather than as an over-statement. It has been qualified by a number of interesting details on the principal factors, which, it is believed, will affect home building activity during the year 1937.

The statistical method used in compiling the study was as follows: The Censuses of 1920–1930 were used to obtain the total increase in dwelling units. After adjustments were made for changes in vacancy, for conversions, demolitions, fire, and other losses, the total volume of construction for the decade thus obtained was distributed on an annual basis. This was accomplished through use of the building permit data for 257 identical cities, and by assuming that these data presented a reasonably accurate measure of the fluctuations in building activity throughout the country for the decade 1920–1930.

To obtain the annual estimates of urban non-farm dwelling units constructed during the years 1931–1936, the ratio of number of new family units to the total number of families in various city-sized groups were utilized. These ratios were based on the Bureau of Labor Statistics building permit data for 257 cities for 1930–1932, for approximately 750 cities for 1933–1935, and for approximately 1,500 cities for 1936. To this figure there was added the rural non-farm estimate, derived by assuming that home building in these areas constituted 20 per cent of the total in all non-farm areas. Summaries of the study have been published. Valuable assistance was rendered in preparing these estimates by George Terborgh, of the Board of Governors of the Federal Reserve System, and by David L. Wickens and Raymond R. Foster of the National Bureau of Economic Research, each of whom presented estimates of construction activities at the annual meeting of the American Statistical Association and the American Economic Association held recently in Chicago.

The *Third Annual Report of the Federal Housing Administration* is now available for distribution. Included in this report is a 35-page statistical analysis of the insuring operations of the Administration. This analysis gives detailed consideration to the activities of the Modernization Credit, Mutual Mortgage Insurance, and Large Scale Housing Divisions, indicating the volume of business transactions; characteristics of the loans, of the property (number of rooms, type of structure, etc.), and of the borrower.

A technique for analyzing mortgage experience data has been prepared and published by the Division. The case study method is utilized and the tabulations it makes possible will reveal such significant lending factors as the relationships of delinquency and of foreclosure to the age and size of the mortgages, year in which the loan was made, type of property, method of repayment, the ratio of the loan to the appraised value, and other significant factors. An analysis of the connection between delinquencies and foreclosures will show the extent to which delinquency leads to foreclosure, and will identify critical periods with regard to delinquency. It is believed that an analytical treatment of this nature covering a large number of mortgages over an extended period of time will result in the establishment of more concise lending principles.

Ernest M. Fisher and Richard U. Ratcliff have completed a report entitled "European Housing Policy and Practice," which gives a brief summary of general principles and conclusions evolved from a survey of housing

in 10 foreign countries. Much of the material is supplemented by statistical data. Copies of the pamphlet are available for public distribution.

Three monographs giving the loan value ratio, the amortization factor, and the borrower's total monthly financial charges on Federal Housing Administration mortgages have been prepared. They enable the various ratios to be secured quickly and without mathematical calculations. All three are available for public distribution.

The Division is carrying forward a study of city growth and structure in an effort to obtain a better understanding of neighborhood changes affecting mortgage risk. The study is based principally upon a series of maps prepared by the Division which present vital real estate facts by blocks for more than 100 cities including 150,000 blocks, and an analysis of the growth of 15 American cities. Arrangements for the publication of the entire study are as yet incomplete, but five special articles based on studies of Washington, Chicago, New York, Detroit, and Miami; together with a summary, are appearing currently in the *Insured Mortgage Portfolio*, a Federal Housing Administration monthly publication.

BUREAU OF LABOR STATISTICS, U. S. DEPARTMENT OF LABOR.—Senate Resolution 298, of the last Congress, directed the Secretary of Labor to report on "the social and economic needs of laborers migrating across State lines." At the Secretary's request, the direction of the investigation was undertaken by the Bureau of Labor Statistics, with the cooperation of the Children's Bureau, the Employment Service, and certain other agencies.

Work on the survey of wages and hours in the bituminous-coal mining industry is well advanced, and it is anticipated that the field survey will have been completed by May 1. This study covers 98 per cent of the territory where bituminous coal is produced. It is conducted however on the basis of a sample, which will include about 90,000 employees or 20 per cent of the total number of workers in the industry. In addition to data on weekly wages and hours of employment, annual earnings are being obtained, and information on time spent going to and from the working place and at lunch. Also, in conformity with the Bureau's present policy, a personnel study is included. Attention is being directed to housing, living conditions, and welfare work as well as to plant personnel methods. Definite plans are being made for wage surveys covering the cotton, rayon, and silk goods industries, and if resources permit, a study of working conditions in the hosiery industry will be made.

The Accident Division is now concentrating its efforts on increasing the coverage of its reports from 7,000 to 25,000–30,000 establishments by an enlarged sample from the 13 industries already reporting, and by the inclusion of 20 additional industries. Cooperative arrangements have been made with trade associations in the fertilizer and construction industries, whereby special surveys will be made of the causes of accidents in those industries.

UNITED STATES EMPLOYMENT SERVICE.—*Occupational Analysis of Active Registrants Completed.* An occupational analysis of over 6½ million persons seeking work through offices of the United States Employment Service was conducted at the close of December. The analysis was designed to indicate the distribution of workers according to their occupational skills and to indicate the number of persons with relief status in the various occupations. For the first time, information concerning the secondary occupational classifications of applicants as well as the occupations in which they were primarily classified was secured.

This occupational survey provides information directly comparable to the occupational classifications secured at the time the more complete inventories of the active file were conducted on July 1, 1936, and during December, 1935.

The present analysis, which covers only occupational information and does not include the full industrial, age, and other classifications prepared in connection with the earlier inventories, established a new record for speed. Preliminary tabulations covering 98.6 per cent of all active job seekers registered with the offices throughout the country were available in less than four weeks after the field work was conducted in the offices.

NEW YORK STATE DEPARTMENT OF LABOR.—The Department will issue soon a study entitled *Trend of Manufactures in New York State from 1919 to 1933* based upon the biennial reports of the U. S. Census of Manufactures. The study brings out the relative position of manufacturing in New York State for the period covered as compared with manufacturing in the United States as a whole. Use is made of the five significant figures revealed by the census, namely number of factories, number of employees, total wage bill, value of products, and value added by manufacture. It is a factual study designed to throw light upon statements made in recent years alleging a "migration" of industry or "exodus" of factories from New York State.

DIVISION OF SOCIAL RESEARCH, WORKS PROGRESS ADMINISTRATION.—Work is in progress on a series of studies of turnover of workers employed on W.P.A. projects. These studies will provide monthly data on the numbers of workers leaving the W.P.A. to accept private employment or for other reasons, the number of workers returning to the W.P.A. because of loss of private employment or for other reasons, and the characteristics of the workers in each category. The studies are to be conducted by small local staffs in nearly 50 urban and rural areas. Interviews with workers provide information on reasons for leaving or for returning to the W.P.A., on the types of private employment secured and the earnings derived therefrom, and the total incomes of families of separated workers.

During November, surveys of labor shortages were made in Rochester, New York; Cleveland, Ohio; and Milwaukee, Wisconsin. The extent and character of the shortages were determined by interviews with employers trade union officials, W.P.A. and relief authorities, and through the coopera-

tion of public employment offices. In each city, data on the characteristics of workers currently employed on projects were transcribed from W.P.A. labor division records and United States Employment Service registration cards. These data were subsequently analyzed to discover to what extent the characteristics of workers, who reported as their usual occupation one of the shortage occupations, were such as to make them acceptable for employment in private jobs. Acceptability was determined with reference to age, physical condition, length and recency of work experience. The findings of the three studies show that definite shortages existed in a number of occupations, especially in skilled manufacturing and building trades, but that there were relatively few workers employed on W.P.A. projects who were able to meet current requirements of employers in the shortage occupations. Another series of surveys of this type is now under way in agricultural as well as urban areas where shortages are reported.

A study of the geographic mobility of labor in Michigan during the period April 1930–December 1934 is now being carried on in cooperation with the Michigan E.R.A. The data were obtained from the Michigan Unemployment Census of January 1935. Tabulation plans were devised to bring out the significant factors thought to bear on workers' mobility, such as personal characteristics, relief status, and employment record. The tables permit the examination of these data with respect to such aspects of mobility as the number, approximate geographic range, and urban-rural character of moves. From the original 520,000 schedules, a 5 per cent sample was tabulated to test the efficacy of the plans. After preliminary analysis of the data thus obtained, final tabulations will be run in Detroit.

The experimental work has been completed on combining the estimated monthly expenditures for public and private assistance in urban areas, as published by the Social Security Board, and the comparable rural series, as published by the Division of Social Research, W.P.A.

The application of sampling procedures to the selection of a group of cities that would be representative of total urban United States has been the subject of a series of experiments. Using census data for all cities of 10,000 or more population, it was found that a sample of 25 cities could be selected, by regions and by size-group, with social and economic characteristics that differed but little from similar characteristics for all cities combined. Field tests based upon these samples are planned.

The following is a list of recent publications of this Division: Research Monograph V—Landlord and Tenant on the Cotton Plantation; The 1935 Relief Population in 13 Cities: A Cross-Section—Research Bulletin, Series I, No. 23; Legislative Trends in Public Relief and Assistance—Research Bulletin, Series III, No. 2; Survey of Cases Certified for Works Program Employment in 13 Cities—Research Bulletin, Series IV, No. 2; Survey of Workers Separated from W.P.A. Employment in Eight Areas During the Second Quarter of 1936—Research Bulletin, Series IV, No. 3; Workers on Relief in the United States in March 1935, A Census of Usual Occupations—Pre-

liminary Edition; Usual Occupations of Workers Eligible for Works Program Employment on January 15, 1936—Preliminary Edition; Current Statistics of Relief in Rural and Town Areas, January–June 1936, June–July 1936, July–August 1936, August–September 1936, September–October 1936, October–November 1936; Combined Farming-Industrial Employment in the Coal and Iron Subregion of Alabama—Research Bulletin, J-4; Combined Farming-Industrial Employment in the Naval Stores Subregion of Georgia and Alabama—Research Bulletin, J-5; and Combined Farming-Industrial Employment in the Lumber Subregion of Alabama, Georgia, and South Carolina—Research Bulletin, J-6.

DIVISION OF RESEARCH, STATISTICS AND RECORDS, WORKS PROGRESS ADMINISTRATION.—*Works Program Statistics.* Effort has been directed toward the perfection and completion of a statistical series on Works Program employment which will be as nearly comparable as possible with the monthly series compiled under the program of the Federal Emergency Relief Administration. This series provides a count of the number of different persons who worked on W.P.A. and other Works Program projects during each calendar month together with their hours of work and earnings. The series on W.P.A. employment from the beginning of the program through the year 1936 will be published shortly. Subsequently, similar data for other Works Program agencies will be made available.

Relief Statistics. Preliminary general relief data for urban areas have been issued for the period through December 1936 and monthly bulletins presenting information for the Continental United States through October 1936 have been published. These publications were prepared under the direction of Mr. Thomas B. Rhodes, Secretary of the Advisory Committee on the Collection of General Relief Statistics which functions through the cooperation of the Social Security Board. Copies of these publications may be obtained from the Works Progress Administration.

A "Statistical Summary of Emergency Relief Activities, January 1933 through December 1935" was published recently. This bulletin contains 44 pages of revised monthly data and a brief technical description of the series.

The *Monthly Reports of the Federal Emergency Relief Administration* through June 1936 have been issued. A section of the June report is devoted to a discussion of the estimated number of families and single persons receiving relief and persons from relief rolls employed on Works Program and Civil Works Program projects. Monthly estimates of the number of families and single persons and of total persons for the Continental United States are presented for the period January 1933 through August 1936.

Construction Statistics Analysis. A research unit has been established in the Division to analyze the volume of employment and expenditures on construction activities in the United States including both public and private work. The estimates developed cover a long period of time and are intended primarily to assist in program planning.

NATIONAL RESEARCH PROJECT, WORKS PROGRESS ADMINISTRATION.—Notes appearing in previous issues of the JOURNAL have outlined the scope of the several studies undertaken by this Project. As of February 1 the work of gathering materials has for the most part been finished and efforts are being concentrated on the tabulation and analysis of the data assembled. Report plans are now taking shape.

Statistical Studies of Changing Productivity. These studies were undertaken for the purpose of organizing historical data on trends in productivity in American industry as a whole and in its individual components.

Published statistical sources relating to production and employment changes in the major manufacturing and non-manufacturing industries have been examined and productivity indexes constructed for more than thirty separate industries. These data will be combined for an analysis of productivity changes in producers' and consumers' goods industries. Such related series as prices, labor and raw material costs, profits, and capital structure are now being assembled.

In addition, studies are being carried on to measure growth of labor supply, changes in employment and unemployment, and occupational and industrial shifts within the labor supply.

Special Studies of Selected Industries. These studies are chiefly concerned with the relationship of mechanical and managerial changes to the volume of production and of employment in the several industries selected for inquiry.

About 700 manufacturing plants representing various industries have been visited to obtain time series on production and employment. In selected industries the surveys are designed to cover collateral economic factors, including the effects of changes in the ratio of output to production capacity, capital devoted to production processes, equipment, wages, prices and competition. The following industries are being studied jointly with the National Bureau of Economic Research: brick and tile, lumber, cement, beet sugar, and flour milling. A survey of machinery and equipment manufacturers is providing data on labor embodied in the equipment used in the production processes of the industries enumerated above and on types and rates of mechanization. The U. S. Bureau of Labor Statistics is cooperating on field surveys and other industries—boots and shoes, leather, silk, cotton and rayon textiles, cigars, cigarettes, and cotton garments—and on a study of the mechanization of selected operations and processes in large offices. A study of capital growth in the automobile and allied industries from 1925–1933 is also under way. The Employment Stabilization Research Institute of the University of Minnesota is cooperating on a study covering changes in equipment, efficiency of labor, job specifications, and occupational requirements in a number of Minneapolis manufacturing plants for a comparative analysis with the results of a similar study by the Institute five years ago.

Studies in the extractive industries are being conducted in cooperation

with the U. S. Bureau of Mines. The work of tabulating materials from the files of the Bureau and amplifying these by field contacts is well advanced. Reports on the individual industries are in preparation.

In a study of the effects of changes in techniques, mechanical equipment, farm practices and market requirements on the volume of employment and production in agricultural pursuits, data have been assembled from the files of the U. S. Department of Agriculture, experiment stations and other sources, and reports are now being prepared. The tabulation of results of a field survey is nearing completion.

A study of the history of technological changes in the railroad industry and their effects on operating efficiency and on railroad labor is under way in cooperation with the Railroad Retirement Board. This study comprises (1) an intensive survey of the history of mechanical and managerial changes and their effects on railroad labor, including employment, earnings, and productivity; (2) an analysis of population changes, trends in earnings, and periods of separation from the railroad service between 1924 and 1933, based on 400,000 personnel and earnings records collected by the Federal Coordinator of Transportation; (3) a field survey of about 4,000 railroad employees, covering employment and unemployment history and data on training and service status. The latter study is designed to supplement the analysis of employment records by bringing them up to date, by adding the record of employment in other industries during periods of separation from the railroad and by distinguishing employment according to its regularity or intermittency.

Surveys of the Effects of Industrial Changes on Labor Markets and on Individual Workers. Another major division of the Project is concerned with the determination and interpretation of employment and unemployment experiences of workers in various industrial situations. Field work in a number of selected localities has now been completed and, in addition, considerable work history material previously collected by other agencies is being analyzed. The Industrial Research Department of the University of Pennsylvania is cooperating on a series of these labor market surveys, in Philadelphia.

The emphasis of the surveys is primarily on employment histories, for the years 1926–1936, of workers in labor market situations in various industries, occupations, and geographic locations. Approximately 18,000 histories have been obtained from the field. Some of the surveys cover single-industry localities; in other cases, the study is concerned only with selected industrial or occupational situations in a diversified labor market. In each case the history of industrial activities and the related history of the working population were surveyed as they pertain to the situation selected for inquiry. Against this historical background, analyses will be made of present employment status of the population and of recent work histories of individuals. In several instances supplementary analyses are being made of personnel, payroll and earnings records of employing concerns.

DIVISION OF PUBLIC ASSISTANCE STATISTICS, SOCIAL SECURITY BOARD.—Since February 1, 1936, this Division has collected monthly reports on old-age assistance, aid to dependent children and aid to the blind from States participating in the administration of public assistance under the Social Security Act. The results of this collection of data are published in three series of publications: (1) a monthly bulletin entitled *Public Assistance, Monthly Statistics for the United States*, of which eleven numbers have been issued, the most recent number covering data for November, 1936; (2) a quarterly bulletin entitled *Public Assistance, Quarterly Review of Statistics for the United States* with a supplement containing data for each county, three numbers of which have appeared, the last for the quarter ending September 30, 1936; (3) a mimeographed report issued on the first of each month giving estimates for the current month, estimates for the preceding month and actual data for the second preceding month.

Accuracy and completeness of data collected through this State reporting system is the first goal of the eleven field representatives of this Division who are assigned to the twelve regions of the Social Security Board. General guidance to State and local statisticians through these field representatives is expected, however, to result in general improvement in State and local organization and procedure for the collection of public welfare statistics.

On November 1, 1936, State agencies cooperating with the Social Security Board began the collection of social information about cases accepted and closed, in accordance with detailed forms and instructions issued by this Division. It is expected that comprehensive social statistics about recipients of public assistance will be produced by this plan.

Since June 1, 1936, this Division has been responsible for the collection, analysis and publication of relief data from 118 urban areas, formerly reporting to the U. S. Children's Bureau. Results of the collection of these data are published in *Changes During the Month in Different Types of Public and Private Relief in Urban Areas*. The most recent number of this bulletin with data for October 1936 was issued on January 21, 1937.

During January 1937 an agreement was reached to transfer the Rural and Town Relief Reporting Sample, formerly the responsibility of the Division of Social Research of the Works Progress Administration to this Division of the Social Security Board before July 1, 1937.

The Division has been cooperating with the Works Progress Administration in the collection of general relief statistics throughout the United States under an interim agreement for the six months period, October 1, 1936, through March 31, 1937. A procedure for an integrated reporting system which will eliminate duplications in the count of cases of general relief and special forms of public assistance for State and local agencies administering more than one form of assistance is expected to be completed in the near future.

For assistance to its Division of Public Assistance Statistics the Social Security Board on June 12, 1936, requested the American Statistical Asso-

ciation and the American Public Welfare Association to form a joint advisory committee. This committee was chosen by the two associations and elected Ralph Hurlin of the Russell Sage Foundation, chairman, and Paul Webbink of the Committee on Social Security of the Social Science Research Council, secretary. The other members are: Neva R. Deardorff, Director, Research Bureau, Welfare Council of New York City; Emil Frankel, Director of Research, New Jersey State Department of Institutions and Agencies; Harry Greenstein, Director, Associated Jewish Charities of Baltimore; Howard Myers, Director, Division of Social Research, Works Progress Administration; and Frederick F. Stephan, Secretary of the American Statistical Association. Morris Copeland, Executive Secretary of the Central Statistical Board, also meets with the Committee.

WOMEN'S BUREAU, U. S. DEPARTMENT OF LABOR.—"The Employed Woman Homemaker in the United States" has recently been released as Women's Bureau Bulletin 148. This is an analysis of unpublished data made available by the Bureau of the Census and will later be supplemented by material compiled from original census data on the family responsibilities of all gainfully occupied women in certain large cities.

Bulletin 147 is a "Summary of State Reports of Occupational Diseases with a Survey of Preventive Legislation." All data available by sex for the years 1932 to 1934 inclusive are here assembled from published and unpublished sources. The bulletin is one of a regular series of reports on occupational diseases and contains valuable reference tables.

The Bureau's report on a recent survey of women's wages, hours of work, and conditions of employment in the State of Tennessee is now in press. In many establishments data were secured also for men employees. In all, 267 plants employing over 29,000 women were visited. One of the most interesting features of the report is the comparison of conditions in 1934 and 1935. In many industries there had been a decided breaking away from the standards set by the N.R.A., but in a few industries the wages improved slightly.

OFFICE OF EDUCATION.—The February issue of *School Life* will have an article on enrollment in commercial subjects in public high schools, the first of a series of preliminary data in this field. The March issue will carry data on enrollments in mathematics subjects.

All chapters of the *Biennial Survey of Education, 1932–34*, are either in bulletin form or in page proof.

"Per capita costs in city schools, 1935–36," Pamphlet No. 70, is in process of printing. A photostat copy of the table for cities of 100,000 population and more is available for loan from the Office of Education.

CONFERENCE ON RESEARCH IN NATIONAL INCOME AND WEALTH.—This Conference, organized in January, 1936,[1] held its second meeting on January 29 and 30 at Hillside, the Riverdale property of the National Bureau of

[1] See this JOURNAL, March 1936, pp. 130–31.

Economic Research. The meeting was attended by representatives from the Universities of Harvard, Columbia, Minnesota, and Wisconsin; from the Central Statistical Board; the Bureaus of the Census, of Agricultural Economics, of Foreign and Domestic Commerce, of Labor Statistics; Division of Research and Statistics of the Treasury; Divisions of Research of the Federal Reserve Board and of the Federal Deposit Insurance Corporation; the Industrial Division of the National Resources Committee; the Brookings Institution, the National Industrial Conference Board, Dun and Bradstreet, and the National Bureau of Economic Research.

Following the submittal and discussion of the report by the Executive Committee on its activity during 1936, the Conference discussed at length the various directions in which cooperative activity in the field could best be furthered in the immediate future. Noting the great value of the data available on the state income tax returns for the study of the distribution of income by size, the Conference approved the efforts made by the Executive Committee to have such data tabulated and made available for use by students in the field. Such tabulation has already been initiated by the State of Wisconsin, and there are promising prospects of having it undertaken for Delaware. The Conference indicated the advisability of obtaining the services of a competent person to devote his time to this work on increasing the primary data bearing on the distribution of income and wealth by size among individuals and families, whether such data be on income tax returns or result from any other statistical surveys. Since such information would prove particularly useful when cross-classified with the regional allocation of income and wealth, the Conference emphasized the value of exploratory work in this direction that could be undertaken by state planning boards and other state agencies, perhaps with the assistance of the National Resources Committee.

Another direction in which cooperative activity developed during 1936 was the initiation of discussion of various problems in the field by individual students, who would submit reports at the annual meetings of the scientific associations and at the meeting of the Conference proper. It was thought that this experiment proved to be quite successful. The reports submitted by Gerhard Colm, Carl Shoup, O. C. Stine, and Solomon Kuznets at the December meetings of the American Economic and American Statistical Associations represented significant contributions toward the solution of the problems discussed. It was recommended that this experiment be continued; that the reports so submitted, as well as the discussion to which they give rise, be published upon review by an editorial committee, as studies of the Conference, the National Bureau being requested to act as publisher.

The Conference has discussed at length the report by M. A. Copeland on *Concepts of National Income*, by Solomon Fabricant on *Treatment of Corporate Savings in National Income*, and by Simon Kuznets on *Adjustment of National Income Totals for Revaluation of Inventories*. These reports were initiated by the special subcommittee on Income Concepts and Terminology

set up in 1936 (M. A. Copeland, Chairman; W. W. Riefler and Simon Kuznets, members). The publication of these reports and of the discussion that developed in connection with them, again upon review by the editorial committee, was recommended. The Conference has also approved the continuation of the subcommittee on Income Concepts and Terminology, as constituted in 1936; the ultimate objective of its work being the establishment of the main points on which agreement existed and the precise formulation of the questions which would still be at issue.

An Executive Committee was elected comprising: Simon Kuznets, Chairman; M. A. Copeland, W. L. Crum, H. M. Groves, G. C. Means, R. R. Nathan, and O. C. Stine.

CONFERENCE ON PRICE RESEARCH.—During the past year substantial progress has been made in developing the program of the Conference on Price Research. (See this JOURNAL, March, 1936, pp. 128–131.) Last summer the Executive Committee authorized exploratory studies in five important industries: steel, petroleum, textiles, automobiles, and coal. For each of these industries a committee composed of research men from universities and other institutions and of representatives of the industry has been set up. Each committee is to define the industrial and economic problems centering in prices and price relations, summarize present knowledge, appraise existing data, and outline a program of research.

Preliminary reports from the steel and textile committees were presented at a round table held in connection with the annual meeting of the American Statistical Association. Another round table, dealing with the general objectives of price research in American industries, was held as one of the meetings of the American Economic Association. The papers presented dealt with industry studies and the nature of competition, industrial price policies and the attributes of industrial prices, and with industrial productivity and prices. It is expected that the five committee reports will be published.

As a basic step in the program to coordinate price research, the Conference has undertaken an inventory of current research projects in this field. Letters requesting information have been sent to persons known to be engaged in price research. Details concerning projects recently undertaken are requested. Such information should be sent to the Conference on Price Research, c/o National Bureau of Economic Research, 1819 Broadway, New York City. It is hoped that this survey will be completed early in 1937, at which time a report will be sent to all who have collaborated in the inventory.

NATIONAL BUREAU OF ECONOMIC RESEARCH.—*Prices in Recession and Recovery* by Frederick C. Mills appeared December 11, 1936. In this 570-page book Dr. Mills analyzes the price movements of recovery against the record of the recession and pre-recession situation. Separate chapters treat of the position of the farmer and other primary producers, the manufac-

turing industries, producers of capital goods, and consumers. In the Appendix are given the basic price index numbers, monthly from 1929 to 1936, which have appeared from time to time in National Bureau publications.

Two *Bulletins* (Numbers 62 and 63) were published in December: *Revaluations of Fixed Assets, 1925–1934* by Solomon Fabricant and *The Recovery in Wages and Employment* by Leo Wolman. The 1937 series will be started, subject to the approval of the Directors, with a double issue, *The Agricultural Crisis*, by Drs. Eugen Altschul and Frederick Strauss. This report, which analyzes in detail the crisis in wheat and in cotton, is one of the products of the investigation by these authors into the relationship of agriculture and business cycles, made possible by a grant from the Falk Foundation. A full report will be issued in book form at a later date. An agreement for cooperative research with the U. S. Department of Agriculture will turn Dr. Strauss' attention this year to an historical study of the interrelations of agriculture and industry.

The National Bureau has announced that an Associate Membership in the organization is now available. Dues are one-fifth those of full membership. Associate Members receive the *Bulletin*, the Annual Report, and a substantial discount on the purchase of National Bureau books.

The National Bureau's Annual report has been prepared this year by Dr. Willits, its Executive Director. The report will be published, as usual, following the Annual Meeting of the Board of Directors on March 1.

INDUSTRIAL RELATIONS COUNSELORS, INC.—A twenty-nine-page monograph entitled *Industrial Pension Systems in the United States and Canada—Certain Phases of Pension Activities for the Years 1931–1934*, has just been completed. It supplements the two-volume work on *Industrial Pension Systems in the United States and Canada* by M. W. Latimer published in 1932. The monograph summarizes the experience reported by 145 companies which employ a vast majority of the persons covered by formal plans. In addition, it includes data for railroad plans taken from the annual reports of the Interstate Commerce Commission and for reinsured plans supplied by insurance companies. Nine tables are presented.

Industrial Relations Counselors, Inc., also has in preparation a study of unemployment insurance administration, based on the organization and administrative procedures of five jurisdictions—Wisconsin, New York, California, New Hampshire and the District of Columbia.

NATIONAL INDUSTRIAL CONFERENCE BOARD.—The Board's studies in the field of national income, initiated by the volume of Mr. Robert F. Martin on *National Income and Its Elements* have been continued by the issue of a volume by the same author on *Income in Agriculture, 1929–1935*. The significant feature of the treatment is that for the first time, net agricultural income estimates have been made by geographic regions. Account has been taken of the part-time nature of a large proportion of the enterprises included in the agricultural statistics, and allowance made for income received

by part-time operators for labor away from the farm. Account is taken of the fact that for comparison with other classes the value of the products consumed on the farm—a part of farm income should be rated at the prices paid by non-farm families. The upshot of this detailed survey is the conclusion that instead of a generally depressed condition in agriculture since 1929, there has been a series of special farm problems affecting special products and regions.

There have been further special studies of income published in the *Conference Board Bulletin*, which is issued for the information of Associates of the Board. Through press releases the major aspects of these studies have been made available to the public at large. They have concerned a further analysis of income in transportation, and income in manufactures. The Board published estimates of income by states for 1929 and 1933 in its *National Income and Its Elements*. Its investigators are now engaged in a study of the geographic distribution of income in all the years 1929 to 1935. This study will deal with the industrial source of income, and the classification of income by type. As a part of this study the Distribution by States of Income from Manufacturing Industry has been treated in the *Conference Board Bulletin*, and a similar treatment of income from mining and from transportation is expected at a comparatively early date.

The income studies of the Board have afforded the basis for a study of "Estimated Payroll Taxes for Unemployment Compensation" (*Bulletin*, January 15, 1937) and will be utilized for a similar study of taxes growing out of the old-age benefits provided by the Social Security Act.

The Board has resumed its Unemployment estimates. An article (*Bulletin*, November 13, 1936) on New Estimates of Employment, Unemployment and the Labor Force gave estimates at quarterly intervals in the years 1930 to 1934, and monthly estimates from January, 1935 to September, 1936. Figures for October and November of last year have been issued in the form of press releases, and similar issues are to be made monthly hereafter.

Work in progress includes among other things an analysis of railroad passenger traffic in relation to railway operations and revenues, and a similar study of railway freight movement, a survey of personnel practices in factory and office administration in a large number of enterprises, a further survey of skilled labor shortage, and the annual study of the Cost of Government.

POPULATION INDEX.—The first number of *Population Index*, a guide to current demographic materials for students, research workers and teachers appeared in January. The *Index* is published quarterly by the School of Public Affairs, Princeton University, and the Population Association of America. It continues the Association's bibliography, *Population Literature*. The current number contains two entirely new sections, Current Items and Statistics, in addition to a bibliography covering more than 400 recent books and articles.

CHAPTER ACTIVITIES

THE ALBANY CHAPTER.—On November 10 the Chapter met to discuss "Statistics in Federal Agencies." A meeting was held on December 1 at the Rensselaer Polytechnic Institute in Troy, New York, at which Mr. C. M. Armstrong, Jr. of the General Electric Company spoke on "Statistical Control of Quality in Manufacturing Operations."

The Albany Chapter of the American Statistical Association met on Tuesday evening, February 2, 1937, at the Candle Light Inn in Albany for dinner and program. Professor E. H. Van Winkle of the Rensselaer Polytechnic Institute gave an interesting illustrated talk on the use of graphs in presenting statistical material. Considerable discussion as to the use of various types of graphs followed the talk. There were 42 members and guests present.

The Chapter held five meetings during 1936 with an average attendance of 24 persons per meeting. There were 39 members of the Chapter at the end of the year.

THE AUSTIN CHAPTER.—The Austin, Texas, Chapter held its first meeting of the academic year 1936–37 on October 22, at the Union Building on the campus of The University of Texas with 20 present. The principal speaker was Dr. Edward L. Dodd, Professor of Actuarial Mathematics, The University of Texas, and one of the lecturers invited to conduct the advanced seminars in Economics and Statistics held during the past summer under the sponsorship of the Cowles Commission for Research in Economics. Dr. Dodd discussed the work of the Cowles Commission and summarized some of the discussions in the recent seminars.

A second meeting was held November 19, with 25 present, at which Mr. Frank Haynes, of the United States Weather Bureau, spoke on the "Work of the Weather Bureau."

On December 8, 1936, the Austin Chapter held a special meeting with Dr. Isador Lubin, United States Commissioner of Labor Statistics, as the guest of honor. Twenty-seven were present. Dr. Lubin spoke briefly of the work of the Bureau of Labor Statistics and of the Central Statistical Board.

The third regular meeting of the year was held January 21, 1937. The principal address was by Mr. Harold K. Tinsley, of the Cotton Marketing Division of the United States Department of Agriculture, whose subject was "Cotton Grade and Staple Statistics Projects of the United States Bureau of Agricultural Economics."

The Austin Chapter had five meetings during 1936 with an average attendance of 25 persons a meeting. There were 37 members at the end of the year of whom seven are members of the American Statistical Association.

THE BOSTON CHAPTER.—The Ninth Annual Meeting of the Boston Chapter was held at the Boston City Club on Friday evening, December 4, 1936.

At the business session the following officers were elected to serve during the ensuing year: President, Professor Donald S. Tucker, Massachusetts Institute of Technology, Vice-President, Paul T. Babson, United Business Service, Secretary-Treasurer, Roswell F. Phelps, Massachusetts Department of Labor and Industries, Directors, Edmund S. Cogswell, Massachusetts Department of Insurance and T. Frederick Brunton, John Hancock Mutual Life Insurance Co.

The general subject for discussion at this meeting was "Certain Statistical Phases of the Social Security Program." Mr. E. R. Livernash of the Massachusetts Institute of Technology spoke on the subject—"Unemployment Compensation in Colorado" and presented the results of a study which he had recently made of the probable operation of the unemployment compensation plan in Colorado. He stated that in his opinion industries like the steel industry and other heavy industries are likely to make more frequent calls on the insurance reserves than industries which produce consumers' goods, and some lines of business would benefit at the expense of others. In Colorado, about fifty per cent of the total number of employed persons would be covered by unemployment compensation and only about twenty-nine per cent would have been covered in 1935 due to shifts in industrial activity. There are also many unemployed persons who become ineligible after exhausting their benefits due to the long duration of their unemployment. The largest group of unemployed was the group which was unemployed for the longest period of time. One large group consisted of coal miners in the southern coal fields of the State, whose unemployment was due to a combination of seasonal, cyclical and technological causes. According to the survey in Colorado, unemployment compensation in that State will provide for those unemployed for short, recurrent periods, but will not provide effectively for those unemployed for long periods of time.

Mr. Louis R. Lipp, Assistant Superintendent of the Massachusetts Division of Old Age Assistance, described the Old Age Assistance System in Massachusetts. The State funds for this purpose are derived largely from liquor license fees and racing taxes. The special poll tax which had been levied for this purpose has been discontinued. There is a rapidly increasing expenditure for old age assistance and no probability of a decrease in the number of cases, because the contributions from the National Social Security System during the next fifteen years, at least, will be too small to result in a reduction in the number of aged persons who will require assistance. The Federal Government, however, is now contributing toward the funds for this purpose and the burden to be borne by the State should eventually be somewhat reduced.

On December 1, 1936, the membership of the Chapter was 101, all of whom are members of the American Statistical Association.

THE CHICAGO CHAPTER.—At a meeting on October 27, 1936, Dr. Joseph S. Davis, President of the American Statistical Association and Director of the Food Research Institute, Stanford University, lead an open forum dis-

cussion of "The Long Term Trend of Farm Prices." At a meeting on December 1, Dr. Garfield V. Cox, Professor of Finance at the University of Chicago, presented "An Analysis of the Inflation Problem." Mr. A. T. Kearney of the McKinsey Wellington & Company spoke on "What Use is Industry Making of Research and Statistics?" at a meeting of the Chapter on January 26, 1937.

The Chapter met six times during 1936 with an average attendance of 64 persons per meeting. At the end of the year there were 103 members in good standing of whom 31 are members of the American Statistical Association.

THE CLEVELAND CHAPTER.—Twenty-nine members and guests were present at the second meeting of the 1936–37 season for the Business Statistics Section held on October 26. Mr. John Love, columnist for the Cleveland Press, delivered an address concerning his observations while visiting Russia during the past summer. The third meeting took place on November 23, at which Mr. William Frew Long, General Manager of Associated Industries of Cleveland, was the speaker. His subject dealt with employee-employer relations in England and how they differ with the situation in this country. Twenty-three members and guests were present. On January 11, the fourth meeting was given over to a discussion of the annual meeting of the Association held in Chicago. The Cleveland Chapter was well represented at the Chicago meeting. The members who had not attended the Chicago sessions were well rewarded for their presence at the luncheon.

The Business Statistics group of the Cleveland Chapter met five times during 1936 with an average attendance of 21 persons. The Annual Meeting of the Chapter was held in May. At the end of 1936 there were 35 members of the Chapter of whom 18 are members of the American Statistical Association.

THE CONNECTICUT CHAPTER.—There were five meetings of the Connecticut Chapter during 1936 with an average attendance of 15 members. At the end of the year there were 82 active members in the Chapter.

THE NEW YORK DISTRICT CHAPTER.—Taking their cue from the international "gentlemen's agreement" of September 25, the various speakers at the November 9th dinner meeting of the New York Chapter of the Association discussed divergent phases of the past, present and possibly future course of world monetary affairs. The subject was discussed first by Professor Edwin A. Kemmerer of Princeton who, with his characteristically clear and practical grasp of currency matters, outlined the merits and shortcomings of the "gentlemen's agreement." In the first place, he stated, it was a definite achievement to have the three leading countries, Great Britain, France and the United States, actually reach a basis of cooperation. Secondly, it does provide a means of settling international clearings. Doctor Kemmerer also drew a grain of encouragement from the "declaration of intention" of the interested nations to work for a reduction of trade restrictions. At the same

time he pointed out that the agreement provided no monetary basis for international stabilization, no standard of value in terms of gold or otherwise. Further, it covers no definite period of time but represents merely a day-to-day arrangement.

Professor Kemmerer digressed here to review the history of the gold standard, pointing out that until the World War it had proved the best basis for a sound currency system despite its faults. The system broke down badly, however, as a result of the war and for two years after the signing of the Armistice. By 1927 most of the leading nations of the world were back on the gold standard and the period 1921–1929 was characterized by a relatively high degree of price stability. With the decline in commodity prices that began in 1929, there began a scramble for gold that culminated in the disruption of the leading currency systems.

Speaking of devaluation, Professor Kemmerer stressed the fact that its benefits were temporary for it constituted a wealth-exhausting process. The ability to maintain a stable currency, difficult in the face of the political temperament today, paid the best dividends in the long run. He concluded his remarks, however, with the observation that the "gentlemen's agreement," perhaps only a short step in the right direction, nevertheless suggested eventual resumption of the gold standard internationally.

The next speaker, Mr, Robert B. Warren, economist for Case, Pomeroy & Company, summarized his approach to the subject under three headings: (1) A factual interpretation of the "gentlemen's agreement" of September 25 and its supplemental announcement; (2) A description of the ideological conflict which in recent years has produced world-wide monetary anarchy; (3) A summary of the findings of the British Royal Commission of 1931, which attempted to find a rational solution of this conflict. Thus Mr. Warren presented "an objective description of contemporary monetary policy, citing the MacMillan report as a statement of its ideology, and the British practice as the most completely formulated example of that ideology, providing a pattern to which other nations appear to be conforming . . . then . . . to fit the agreement into its place as a significant episode in the evolutionary stream of monetary theory and practice."

Mr. Warren's summary of the "gentlemen's agreement" emphasized the fact that it did not represent a stabilization compact but outlined a *modus operandi* for international monetary intercourse, acknowledged that the international value of their respective currencies are a matter of mutual concern to the interested parties, adopted gold as the international medium of exchange, and provided the stabilization or equalization fund as the mechanism for carrying on the joint relationship.

A review of the so-called "ideology of money" cited the ancient conflict between the advocates of the theory of money as a repository of value and those who considered its primary function as a medium of exchange, that it need have no value in itself but should be accepted by society as a creature of the State. Bringing the controversy down to modern times, Mr. Warren touched upon recent unhappy monetary history and attached great signifi-

cance to the conclusions of the MacMillan report as a possible solution to the problem. The salient features of the Commission's report called for the use of gold *only* to meet deficits in the international balance of payments and, secondly, that the situation called for a managed currency for domestic purposes. The principles thus laid down and followed in their essentials by Great Britain with apparently considerable measure of success seem destined for wider application under the "gentlemen's agreement."

Striking off on a more pessimistic note, Dr. Walter E. Spahr, Professor of Economics at New York University, drew small comfort from the agreement as indicative of a satisfactory permanent monetary mechanism for the United States, either internationally or domestically. Professor Spahr characterized the "gentlemen's agreement" as follows:

(1) It said nothing tangible about currency stabilization and
(2) It is a rare collection of pious platitudes. I think one could study that document till doomsday and not know what the monetary policy of the United States is or is to be.

Further currency tinkering is looked for, with this Administration committed to a managed currency and/or commodity dollar. Public apathy in failing to bring pressure to bear for a sound currency system is decried by Professor Spahr, who further suggests that our immediate task is

(1) to watch our government constantly in matters involving our currency, and to let the government know that it is being watched, in the hope that this may have some beneficial effect, and
(2) to urge that no further steps be taken until an expert, non-partisan commission has been appointed to study our money and banking problems, and to hold open hearings and to draft model money and banking laws. At that time, plans for international stabilization of currencies would receive appropriate consideration.

The general discussion that followed the regular speeches centered about Doctor Gustav Stolper's pithy remarks concerning the facts and conclusions presented by the other speakers. He took issue with Mr. Warren particularly, attributing the disruption of the international currency situation to the vast and economically unsound increase in the world debt, culminating in the deflationary spiral set off by the collapse of the Austrian Credit-Anstahlt.

There seems little doubt that we are watching important monetary history in the making. *J. Ross Haas, Moody's Investors Service.*

The New York District Chapter held three meetings during 1936 with an average attendance of 240. Approximately 675 members of the American Statistical Association live in or near New York and under the provision of the Chapter's constitution are members of the Chapter.

THE PHILADELPHIA CHAPTER.—"Problems of International Currency Stabilization" were discussed by the Chapter at the meeting on December 11, 1936. There were two principal speakers. Dr. Amos Taylor of the Finance Division, U. S. Department of Commerce, spoke on "Methods Employed in Compiling Data on International Investment"; Mr. Walter Gardner of the

Division of Research and Statistics, Board of Governors of the Federal Reserve System, spoke on "International Gold Movement."

There were four meetings of the Chapter during 1936.

THE PITTSBURGH CHAPTER.—The Chapter met on September 24 to hear a discussion on the degree of recovery and probable future activity in three major lines of business activity. Mr. G. A. Doyle of the Bell Telephone Company of Pennsylvania spoke on "Communication;" Mr. David Tynberg of Kaufmann's Department Store spoke on "Merchandizing;" and Mr. B. E. V. Luty of the *American Metal Market* sent a paper on "Steel" which was read in his absence by Mr. Bervard Nichols of the Bureau of Business Research, University of Pittsburgh.

On October 22, luncheon and evening meetings were addressed by Mr. Claude E. Robinson who interpreted the Presidential polls conducted by various newspapers and magazines.

The Chapter held ten meetings during 1936 with an average attendance of 30 persons. At the end of the year there were 68 members of the Chapter of whom 23 are members of the American Statistical Association.

THE SAN FRANCISCO CHAPTER.—Dr. M. K. Bennett, Food Research Institute, Stanford University, spoke before the San Francisco Chapter on November 12, 1936, on "The Measurement of Relative National Standards of Living." A summary of his paper follows:

Standards of living was defined as the per capita quantum of goods and services used by national groups. The countries considered were United States, British Isles, Germany, France, Italy, Spain, Portugal, Belgium, Holland, Switzerland, Denmark, Norway, Sweden, Finland.

Goods and services for consumption fall into five categories: professional services, transport and communication, food, clothing, and shelter. Theoretically, measures of relative national standards of living ought to cover each of these fields. But specific measures ought not to take account of the most basic requirements of life such as the crudest forms of food, shelter, and clothing; or of goods and services which are exotic or peculiar and not universally desired.

The practical problem is to find statistical series which together cover all fields of standard of living. But none could be found which gave useful indications of relative national per capita standards of clothing and housing. Fourteen series seemed serviceable to cover the other three fields: death rates per 1,000 inhabitants (inverted); birth rates (inverted); percentage of total occupied population engaged in professional service; percentage of population age 5–20 attending elementary and secondary schools; pieces of mail per capita handled by postal services; telephone instruments per 1,000 inhabitants; mileage of telephone and telegraph wire per 100,000 inhabitants; telegraph messages sent per 1,000 inhabitants; railway locomotives per 1,000 inhabitants; motor vehicles per 1,000 inhabitants; raw sugar per capita domestically retained; tobacco per capita domestically retained; tea, coffee, and cacao domestically retained; citrus fruits and bananas domestically retained.

It was admitted that none of these indicators could be regarded as precisely appropriate or precisely accurate. They were, however, combined (a) by a process of ranking and scoring and (b) by a process of conversion to index numbers and averaging. The resulting general indexes gave results as follows, when group averages were taken as 100 (numbers in parentheses representing weighted averages of 14 index numbers for each country): United States, 166 (188); British Isles, 135 (122); Denmark, 130 (126); Switzerland, 125 (114); Holland, 118 (114); Belgium, 118 (108); Sweden, 110 (109); Germany, 110 (101); Norway, 107 (102); France, 106 (96); Finland, 50 (66); Italy, 49 (57); Spain, 48 (51); Portugal, 28 (42).

In conclusion, it was stated that these general indexes could not be trusted as close measures of differences in national standards of living, but that they probably sufficed to differentiate between five groups of countries and that large differences in the indexes were presumably indicative of large differences in standards of living. It was suggested that the method perhaps had sufficient validity to warrant its application to a longer list of countries with illuminating results.

On September 30, at the end of the fiscal year of the Chapter there were 105 members, of whom 23 are members of the American Statistical Association. The Chapter held five meetings during 1936 with an average attendance of 36 persons.

THE WASHINGTON STATISTICAL SOCIETY.—A discussion of "The Business Outlook in 1937" was the subject of a meeting of the Washington Chapter on December 1, 1936. The speakers were Eric Englund, Bureau of Agricultural Economics, "The Agricultural Outlook in 1937;" Frank R. Garfield, The Board of Governors of the Federal Reserve System, "Industrial Production in 1937;" Emerson Ross, Works Progress Administration, "Public Works and Employment;" Woodlief Thomas, Board of Governors of the Federal Reserve System, "Credit, Banking and the Capital Markets;" and Louis Bean, Department of Agriculture, "Summary of Forecasts."

The Chapter met on January 13, 1937, at George Washington University. The topic of discussion was "Measuring Unemployment." The program for the evening included three speakers, Mr. Ewan Clague of the Social Security Board presiding. The first speaker on the program, Mr. Howard B. Myers of the Works Progress Administration, spoke on the subject of "What We Need to Know about Unemployment." After stressing the limited amount of current data on unemployment, he proceeded to outline the information essential for an intelligent attack on the problem. Among the more important items, Mr. Myers listed (1) the number of persons out-of-work and their geographical distribution; (2) duration of unemployment; (3) such primary characteristics as age, sex, color, education, etc.; (4) employment and unemployment histories; (5) previous occupations and present abilities; (6) causes of loss of employment; (7) need for training or retraining; (8) employment trends and future employment prospects; (9) geographical and occupational mobility of the unemployed; (10) resources of unemployed persons and their families; (11) incidence of unemployment within family

groups; (12) effects of unemployment on individuals and family life. These items were offered not as a complete outline of needs, but merely as a starting point in a survey of needed information.

Mr. Myers was followed by Mr. John N. Webb, also of the Works Progress Administration, who read a paper on "Limitations of the Census Method." Mr. Webb maintained that the census method was adaptable to the enumeration of comparatively simple phenomena that changed slowly in time, and that unemployment was too complex and too dynamic to lend itself to such a method. He pointed out that in the absence of a workable and generally acceptable definition of unemployment, an unemployment census could not be relied upon for an accurate count of the unemployed. Mr. Webb then proceeded to demonstrate, using examples drawn from field studies, that the census method would not readily provide satisfactory information on duration of unemployment, and, in many instances, on the occupations of the unemployed and the industries from which they came. In conclusion, he suggested that the extensive developments of sampling techniques in recent years be applied to the measurement of unemployment until such time as a reliable national reporting system is devised.

The last scheduled speaker of the evening was Mr. Calvert L. Dedrick of the Census Bureau. Mr. Dedrick spoke on the "Merits of the Census Method." Mr. Dedrick conceded that an unemployment census would not furnish: (1) current data on unemployment; (2) case work details on employability; (3) causes of unemployment; or even (4) a scientifically accurate and uniform definition for all the unemployed. Such data, he stated, are required by those in charge of placement and relief, and they are available, to a much larger extent than is usually realized, for the relief population and for all persons currently registered with the U. S. Employment Service. Although these data are adequate for immediate tasks they do not provide a sufficient coverage for long time planning of a social security and relief program. Mr. Dedrick pointed out that the principal use of a census of employment and unemployment at this time would be to serve as a base line for current data and a comprehensive inventory of certain major population and employment categories. A number of new statistical series are likely to result from the administration of the Social Security Act, and these series will increase the usefulness of current statistics now secured, if an adequate common base is provided by a national census.

Before the discussion from the floor began, Mr. William E. Stead of the U. S. Employment Service spoke on the registration and placement activities of his organization and the extent to which it could be depended upon to furnish comprehensive unemployment statistics in the future, and Mr. Clague stressed the need for data by the Social Security Board on the duration of unemployment.

There were four meetings of the Chapter during 1936 with an average attendance of 90 persons. Approximately 359 members of the American Statistical Association live in or near Washington and under the provision of the Chapter's Constitution are members of the Chapter.

NEW MEMBERS

Adams, Marvin, P. O. Box 105, Los Altos, California

Baxter, Winthrop S., Assistant Economist, Division of Statistical and Historical Research, Bureau of Agricultural Economics, Washington, D. C.

Beebe, Gilbert W., Research Assistant, The National Committee on Maternal Health, Inc., 2 East 103rd Street, New York City

Benner, Carl F., 2880 Winthrop Road, Shaker Heights, Cleveland, Ohio

Biehl, Katharine A., Research Assistant, Bureau of Business Research, Federation of Social Agencies, 519 Smithfield Street, Pittsburgh, Pennsylvania

Bloom, Royal F., Research Assistant, University of Minnesota, 307 NMA, Minneapolis, Minnesota

Boyd, K. K., Statistician, Emery Industries, Inc., 4300 Carew Tower, Cincinnati, Ohio

Bryan, Herbert L., Junior Statistician, New York State Department of Social Welfare, State Office Building, 80 Center Street, New York City

Burgess, Charles P., Security Analyst, Heller, Bruce & Company, 1200 Mills Tower, San Francisco, California

Chamberlain, Thomas Wesley, Yale School of Public Health, New Haven, Connecticut

Clark, Warren, Security Analyst, Brown Brothers Harriman & Company, 59 Wall Street, New York City

Coble, James Arthur, Statistician, Sales Research Department, Standard Oil of Indiana, 910 South Michigan Avenue, Chicago, Illinois

Cornwall, William Leek, Cost Accountant, Broder Canning Company, Ltd., 12 Front Street, New Westminster, British Columbia

Cox, Gertrude M., Research Assistant, Statistical Laboratory, Iowa State College, Ames, Iowa

Cummings, W. Barton, Personal Trust Officer, Chemical Bank & Trust Company, 165 Broadway, New York City

Cutts, Jesse M., Chief, Wholesale Price Division, Bureau of Labor Statistics, U. S. Department of Labor, Washington, D. C.

Dart, Helen M., Associate Social Statistician, Social Security Board, Room 1300, 211 West Wacker Drive, Chicago, Illinois

DeLury, Dr. Daniel B., Student, Columbia University, New York City

Deming, Dr. W. Edwards, Physicist, Bureau of Chemistry and Soils, Fixed Nitrogen Research Laboratory, Friendship Post Office, Washington, D. C.

Droba, Dr. Daniel D., Research Analyst, Division of Social Research, Works Progress Administration, 1734 New York Avenue, N. W., Washington, D. C.

Ehrlich, Leonard, Assistant Clerk, Division of Placement and Unemployment Insurance, New York State Department of Labor, 342 Madison Avenue, New York City

Feldman, Louis L., Statistical Assistant, American Public Health Association, 50 West 50th Street, New York City

FitzGerald, Dr. Norman Dunham, Petroleum Economist, Department of Petroleum Economics, The Chase National Bank, 18 Pine Street, New York City

Foley, James H., Jr., Supervisor—Statistics, Providence Public School Department, 20 Summer Street, Providence, Rhode Island

Foultz, G. Raymond, Statistician, Hamilton Watch Company, Columbia & West End Avenues, Lancaster, Pennsylvania

Franks, J. Russell, Statistician, Bureau of Power & Light, City of Los Angeles, c/o J. C. Albert, 1630 North Main Street, Los Angeles, California

Fuller, Douglas R., Economist and Security Analyst, North American Investment Corporation, 2500 Russ Building, San Francisco, California

Gabler, Dr. Werner K., Director of Research, Gimbel Brothers, Chestnut, Market, Eighth & Ninth Streets, Philadelphia, Pennsylvania

Girshick, Meyer A., Research Assistant in Theoretical Statistics, 509 Fayerweather Hall, Columbia University, New York City

Golovin, Nicholas E., Research Statistician, R. H. Macy & Company, Inc., New York City

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Gowdy, R. W., Statistician, Mackubin, Legg & Company, Redwood & South Streets, Baltimore, Maryland

Graetz, Adolph H., Statistician, Arnold Bernhard, Investment Counsel, 347 Madison Avenue, New York City

Griffin, John I., Graduate Student in Economics, Columbia University, New York City

Gronewald, Robert G., Assistant Statistician, Works Progress Administration, 1400 G Street, N. W., Washington, D. C.

Hale, Mark Pendleton, Statistician, Missouri State Children's Bureau, Jefferson City, Missouri

Hellman, Louis Philip, Special Student, Johns Hopkins University School of Hygiene and Public Health, 615 North Wolfe Street, Baltimore, Maryland

Holmes, Richard Lewis Anthony, Instructor in Statistics under the London County Council, London, England

Horn, Hubert W., Senior Statistical Clerk, FERA and Social Security Board Joint Advisory Committee on the Collection of Relief Statistics, Washington, D. C.

Houston, G. Sidney, Manager, Investment Research Department, First Service Corporation, First National Bank Building, St. Paul, Minnesota

Janssen, Theodore A., Technical Assistant, Division of Vital Statistics, Bureau of the Census, Department of Commerce, Washington, D. C.

Jellinek, E. Morton, Assistant Director of Research, Memorial Foundation for Neuro-Endocrine Research, Worcester State Hospital, Worcester, Massachusetts

Kaasa, Herman T., Actuarial and Statistical Assistant, General Electric Company, 1 River Road, Room 732, Building No. 5, Schenectady, New York

Kadison, Milton, President, Kimberley Equities Corporation, Room 1000, 61 Broadway, New York City

Kelley, Leroy F., Treasurer, Pittsfield Coal Gas Company, 31 South Street, Pittsfield, Massachusetts

Knupfer, Genevieve, Graduate Student, Columbia University, New York City

Lasher, Blanche Yetive, Student, Brooklyn College, Brooklyn, New York

Lifchutz, Mark, Statistician, Division of Self-Help Cooperative Service, State Relief Administration, 741 South Flower Street, Los Angeles, California

Loebl, Stephen M., Member of Staff and Special Investigator, United States—

District of Columbia Fiscal Relations Study, National Emergency Counsel, 1405 G Street, N. W., Washington, D. C.

Luey, Laurence D., Analyst of Stocks and Bonds, Room 1407, 14 Wall Street, New York City

Mackey, John W., Statistician, Strassburger & Company, 133 Montgomery Street, San Francisco, California

MacRury, Norma, Investigator in Charge, National Research Project, Works Progress Administration, City Hall, Manchester, New Hampshire

Malcheski, Henry Thomas, Research Supervisor, Retail Price Survey, University of Chicago, Chicago, Illinois

Masche, W. Carl, Supervisor, Department of Research, Statistics, & Reports, State Relief Agency of Minnesota, Federal Building, Fifth & Wabasha, St. Paul, Minnesota

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McNeil, Helen, 135 East 52nd Street, New York City

McVittie, Charles Archibald, Statistician, Dick & Merle-Smith, 30 Pine Street, New York City

Merrick, Pat, Research Department of Public Welfare, California State Chamber of Commerce, Ferry Building, San Francisco, California

Mills, Dudley H., President, Discount Corporation of New York, 58 Pine Street, New York City

Mitchell, Roy O., Associate, J. Blair Easter, 97 Vandergrift Building, Pittsburgh, Pennsylvania

Monroe, Dr. Day, Chief, Economics Division, Bureau of Home Economics, South Building, Department of Agriculture, Washington, D. C.

Morse, John Willard, Consulting Statistician, Milbank Management Corporation, Chrysler Building, New York City

Nagelberg, Morton S., Laboratory Assistant in Statistics, Columbia University, New York City

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Phelps, Elizabeth, Economist, Department of Agriculture, Bureau of Home Economics, Room 6410, Department of Agriculture, South Building, Washington, D. C.

Phillips, William L., Statistical Analyst, The Van Sweringen Company, 37th Floor, Terminal Tower, Cleveland, Ohio

Pollard, Dr. H. Marvin, Instructor in Internal Medicine and Secretary to the Medical School, University of Michigan Medical School and University Hospital, Ann Arbor, Michigan

Price, Irving, Assistant Statistician, Works Progress Administration, 1734 New York Avenue, N. W., Washington, D. C.

Reagh, Russel R., Government Actuary, United States Government, Room 162, Treasury Department, Washington, D. C.

Rightor, Chester E., Chief Statistician, Bureau of the Census, Room 5222, Commerce Building, Washington, D. C.

Robinson, Professor Henry A., Professor of Mathematics and Statistics and Lecturer in University System of Georgia Evening School, Agnes Scott College, Decatur, Georgia

Rumple, Barry T., Assistant Chief Statistician, National Broadcasting Company, 30 Rockefeller Plaza, New York City

Schauer, Emma, Research Assistant, Bureau Social Research, Federation of Social Agencies and Carnegie Institute of Technology, 519 Smithfield Street, Pittsburgh, Pennsylvania

Sharp, Dr. James B., Coordinator of Statistical Projects, Works Progress Administration, 49 Fourth Street, San Francisco, California

Short, Oliver C., Executive Assistant to Director, Bureau of the Census, Room 5802, Department of Commerce, Washington, D. C.

Sissman, Mrs. Louise, Research Assistant, Division of Research and Statistics, Board of Governors, Federal Reserve System, Washington, D. C.

Sloan, J. H., Statistician, Division of Public Assistance, 1201 State Office Building, Columbus, Ohio

Sneed, Melvin W., Research Assistant, University of Missouri and Assistant State Supervisor, Rural Research Section, Works Progress Administration, 231 Mumford Hall, Columbia, Missouri

Sogge, Dr. Tillman M., Associate Statistician, Bureau of Research & Statistics, Social Security Board, National Theatre Building, Washington, D. C.

Squires, Charles Clyde, Jr., Assistant to Director of Research, Federal Advertising Agency, Inc., 444 Madison Avenue, New York City

Staudt, Mrs. Esther W., Graduate Student, Columbia University, New York City

Stier, W. Rudolf F., Regional Research Supervisor, Works Progress Administration, 1734 New York Avenue, N. W., Washington, D. C.

Stone, Roger T., Vice-President, Stone-Stevens-Howcott-Halsey, Inc., 625 Whitney Building, New Orleans, Louisiana

Strong, Prentice, Partner, Glenny Roth & Doolittle, 120 Broadway, New York City

Surveyer, Arthur, General Manager, International Bond & Share Corporation; Senior Partner, Arthur Surveyer & Company; Dominion Square Building, Montreal, P. Q., Canada

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Williams, Dr. John H., Professor of Economics, Harvard University and Vice-President of Federal Reserve Bank of New York, 33 Liberty Street, New York City

Wilson, Harry D., Assistant Supervisor Finance and Statistics, District #2, Works Progress Administration for Illinois, 2nd Floor, Merchandise Mart, Chicago, Illinois

Winey, Harold E., Director of Research, Dayton Bureau of Community Service, 225 North Jefferson Street, Dayton, Ohio

Winslow, Harry J., Associate Statistician, Social Security Board, Room 404, National Theatre Building, Washington, D. C.

Youden, Dr. William J., Physical Chemist, Boyce Thompson Institute for Plant Research, 1086 North Broadway, Yonkers, New York

Zubin, Dr. Joseph, Assistant Psychologist, U. S. Public Health Service, c/o The National Committee for Mental Hygiene, 50 West 50th Street, Room 822, New York City

PROCEEDINGS

NINETY-EIGHTH ANNUAL MEETING

STEVENS HOTEL, CHICAGO

PROGRAM

MONDAY, DECEMBER 28, 1936

—10:15 A.M.—

I. STATISTICS AND ECONOMETRICS
(With Econometric Society and Institute of Mathematical Statistics)
Chairman: Irving Fisher, Yale University

The General Welfare
Harold Hotelling, Columbia University

Some New Indexes of Agricultural Supplies and Carryover
E. J. Working, University of Illinois

New Indexes of Stock Prices and Yields and Their Relation to the Theories of Capital and Savings
Charles F. Roos, Cowles Commission for Research in Economics

Discussion: Louis H. Bean, U. S. Department of Agriculture
Willard L. Thorp, Dun and Bradstreet, New York City

II. CONSTRUCTION AND REAL PROPERTY STATISTICS
Chairman: Morris A. Copeland, Central Statistical Board

Problems of Measuring Currently the Volume of Building Construction
David L. Wickens and Ray R. Foster, National Bureau of Economic Research

Construction Cost and Value Indexes
Frank R. Garfield, Board of Governors of the Federal Reserve System, and William M. Hoad, Central Statistical Board

The Use of County Records of Deeds and Mortgages to Provide Current Indexes of Real Estate Transfers and Changes in Mortgage Status
Donald Jackson, Bureau of Agricultural Economics, and L. Durward Badgley, Federal Housing Administration

The Use of Current Sampling Inquiries to Measure Rents and the Occupancy and Vacancy of Property
Howard G. Brunsman, Federal Housing Administration

III. TEACHING STATISTICS IN SCHOOLS OF BUSINESS
Chairman: F. Leslie Hayford, General Motors Corporation, New York City

Developing Judgment in the Use of Statistics
Theodore J. Kreps, Stanford University

Notes on Instruction in Business Statistics
Olin W. Blackett, University of Michigan

The Teaching of Business Statistics
Theodore H. Brown, Harvard University

Discussion: John W. Scoville, Chrysler Corporation, Detroit, Michigan
Ralph C. Epstein, University of Buffalo

MONDAY, DECEMBER 28, 1936

—10:15 A.M.—

IV. STATISTICAL REQUIREMENTS OF SOCIAL INSURANCE PROGRAMS
(With American Association for Labor Legislation)
Chairman: Isador Lubin, Bureau of Labor Statistics
Arthur J. Altmeyer, Social Security Board
George E. Bigge, Brown University
Christian E. Jarchow, International Harvester Company
Discussion: S. M. DuBrul, General Motors Corporation
Ewan Clague, Social Security Board
Aryness Joy, Central Statistical Board
M. B. Givens, New York Department of Labor

—12:30 P.M.—

I. COMMITTEE ON CENSUS ENUMERATION AREAS
Chairman: Howard Whipple Green, Cleveland Health Council

II. COMMITTEE ON SOCIOMETRICS
Chairman: George A. Lundberg, Bennington College

—2:30 P.M.—

I. CONTRIBUTIONS TO STATISTICAL TECHNIQUE
(With Institute of Mathematical Statistics)
Chairman: A. R. Crathorne, University of Illinois

Intra-sampling Theory
Harry C. Carver, University of Michigan

Efficient Measures of Relative Dispersion
Nilan Norris, University of Maryland

Correlation Functions in the Correlation Analysis of Time Series
Herbert E. Jones, Cowles Commission for Research in Economics

Contribution to the Theory of Multivariate Statistical Analysis
William G. Madow, Columbia University

A New Form of Periodogram Analysis and Comparison with Previous Forms
(Read by title)
Dinsmore Alter, Griffith Observatory

A General Invariant Criterion of Fit for Lines, Planes, and Series Expansion Where All Variants Are Subject to Error
Charles F. Roos, Colorado College

Use of Scores in an Exact Test of Significance in a Discontinuous Distribution
H. W. Norton III, Iowa State College

On the Analysis of Variation in General Death Rates
Arthur Ollivier, Mississippi State College

II. STATISTICS AND MARKETING PROBLEMS
(With National Association of Marketing Teachers)
Chairman: Albert Haring, Lehigh University

Statistical Methods from Other Fields Which Can Be Adapted to Market Studies
Theodore H. Brown, Harvard University

MONDAY, DECEMBER 28, 1936

—2:30 P.M.—

II. STATISTICS AND MARKETING PROBLEMS (*Continued*)

Highlights of the 1935 Census of Distribution
Fred A. Gosnell, U. S. Census of Distribution

Improved Objective Standards for Regional Sales Performance
Donald R. G. Cowan, Swift and Company, Chicago

Uses of Distribution Census Material in Marketing Studies
Vergil Reed, Bureau of the Census

III. USE OF STATISTICS IN INDUSTRIAL CORPORATION REPORTS
Chairman: F. Leslie Hayford, General Motors Corporation

Corporation Statements as the Basis of Investment Policy
Laurence H. Sloan, Standard Statistics Company, New York City

Some Inadequacies in Corporation Reports and Suggested Remedies
Alexander Sachs, The Lehman Corporation, New York City

Discussion: Clyde J. Crobaugh, The Survey Corporation
Ragnar D. Naess, Goldman, Sachs and Company, New York City

IV. RESEARCH IN BUSINESS CYCLES
(With American Economic Association)
Chairman: W. L. Crum, Harvard University

Progress Report of the American Statistical Association Committee to Appraise the Statistical Evidence of the Causes of the 1929–32 Business Collapse
Willford I. King, New York University

Questions Raised by the Recent Business Collapse and Recovery
Joseph B. Hubbard, Harvard Business School

The Notions of "Economic System" Underlying Business Cycle Analysis
Karl Pribram, The Brookings Institution

Business Cycle Theories and Their Factual Verification
G. Haberler, Harvard University

A Study of Recent Business Experience
Norman J. Silberling, Stanford University

Discussion: Irving Fisher, Yale University
Alvin H. Hansen, University of Minnesota

—8:00 P.M.—

I. PROBLEMS OF MANAGED CURRENCIES
(With American Economic Association)
Chairman: W. Randolph Burgess, Federal Reserve Bank of New York

The Situation of Gold Today in Relation to World Currencies
Alvin H. Hansen, University of Minnesota

The Existing Mechanisms and Objectives for the Control of Exchange
Bertil Ohlin, Handelshogskolen, Stockholm

The Adequacy of Existing Currency Mechanisms under Varying Circumstances
John H. Williams, Harvard University

MONDAY, DECEMBER 28, 1936

—8:00 P.M.—

II. METHODS OF MEASURING CULTURAL VARIABLES
(With American Sociological Society)
Chairman: George A. Lundberg, Bennington College

A Quantitative Analysis of Cultural Diffusion in the United States
R. V. Bowers, University of Rochester

Consistency of Recording Statistical Data From Prison Files
Barkev S. Sanders, Department of Justice

Methods of Studying the Social Effects of the Depression
Samuel A. Stouffer, University of Chicago

Discussion: H. Earl Pemberton, Social Security Board

III. ROUND TABLE ON VITAL STATISTICS
Chairman: Lowell J. Reed, Johns Hopkins University

A discussion of the problems involved in the intercorrelation of official vital statistics and the results of the 1940 population census, with the object of making the joint study of these two bodies of material as productive as possible.

IV. MEASUREMENT OF PUBLIC OPINION
Chairman: Harwood L. Childs, Princeton University

George B. Gallup and Harold H. Anderson, American Institute of Public Opinion
W. L. Crum, Harvard University
Louis H. Bean, U. S. Department of Agriculture

TUESDAY, DECEMBER 29, 1936

—9:00 A.M.—

ANNUAL BUSINESS MEETING

Proposed Amendments to Constitution and By-Laws
Reports of Committees and Representatives

—10:00 A.M.—

I. SELECTED TOPICS IN STATISTICAL ECONOMICS
(With American Economic Association)
Chairman: Henry Schultz, University of Chicago

A Theory of Loss Leaders
Theodore O. Yntema, University of Chicago

Relation of Price to Quality and to Degree of Competition
Roswell H. Whitman, R. H. Macy & Company, New York City

Short Selling and the Stabilization of Stock Prices
Harry Pelle Hartkemeier, University of Missouri

Discussion: A. J. Nichol, University of Maryland
Francis E. McIntyre, Stanford University
Garfield V. Cox, University of Chicago

TUESDAY, DECEMBER 29, 1936

—10:00 A.M.—

II. STATISTICAL PROBLEMS IN SAMPLE ENUMERATIONS
(With American Farm Economic Association)
Chairman: G. F. Warren, Cornell University

Considerations in the Selection of Areas for Sample Agricultural Enumerations
J. B. Shepard and H. H. Schutz, Bureau of Agricultural Economics

Methods and Problems of Sampling Presented by the Study of Family Expenditures
Erika H. Schoenberg, National Resources Committee, and
Mildred Parten, Bureau of Labor Statistics
Discussion: Alexander Sturges, Bureau of Agricultural Economics
Zellmer R. Pettet, Bureau of the Census
J. I. Falconer, Ohio State University
Calvert L. Dedrick, Bureau of the Census

III. OLD AGE INSURANCE
(With American Association for Labor Legislation)
Chairman: Meredith B. Givens, New York Department of Labor

Comparison of the British and American Systems
J. Douglas Brown, Princeton University

The Problem of Reserves and a Possible Solution
M. Albert Linton, Provident Mutual Life Insurance Company, Philadelphia
Discussion: Edwin E. Witte, University of Wisconsin
Russell R. Reagh, U. S. Department of the Treasury

IV. SOME SOCIAL TRENDS
(With American Sociological Society)
Chairman: Neva R. Deardorff, Welfare Council of New York City

Population Characteristics Associated with Educational Levels in Chicago
Richard O. Lang, Central Statistical Board

Trends in Population Movements in Sweden
Dorothy S. Thomas, Yale University

Trends in Women's Work Since 1900
Chase G. Woodhouse, Connecticut College for Women
Discussion: Frank Lorimer, Population Association of America
Mildred Fairchild, Bryn Mawr College

V. PROBLEMS OF MANAGED CURRENCIES
(With American Economic Association. Invitational round table for discussion of previous papers.)
Chairman: James W. Bell, Northwestern University

TUESDAY, DECEMBER 29, 1936

—12:30 P.M.—

LUNCHEON MEETING

Chapter Representatives and Directors of the American Statistical Association

—2:30 P.M.—

I. IMPROVEMENT OF PERSONNEL IN THE TECHNICAL SERVICES OF THE FEDERAL GOVERNMENT

(With American Economic Association and American Farm Economic Association)

Chairman: Morris A. Copeland, Central Statistical Board

A Critique of Federal Personnel Policy as Applied to Professional Social Science Positions

William E. Mosher, Syracuse University

New Opportunities for Economists and Statisticians in Federal Employment

Leonard D. White, Civil Service Commission

Government Employment as a Professional Research Career in Economics

Isador Lubin, Bureau of Labor Statistics

II. LOGICAL VERSUS EMPIRICAL EQUATIONS IN THE SOCIAL AND BIOLOGICAL SCIENCES

Chairman: Herbert A. Toops, Ohio State University

The Logic of Empirical Equations

George W. Snedecor, Iowa State College

Physico-Mathematical Methods in Biological and Social Sciences

N. Rashevsky, University of Chicago

The Use of the Logical Equation in Epidemic Theory

Lowell J. Reed, The Johns Hopkins University

Some Aspects of the Deductive and Empirical Methods in Economics

Theodore O. Yntema, University of Chicago

III. MEASUREMENT OF COMPONENTS OF THE NATIONAL INCOME

(With Conference on Income Research)

Chairman: Alvin H. Hansen, University of Minnesota

Problems of Measurement of Labor Income

Solomon Kuznets, Bureau of Labor Statistics

Problems in the Measurement of Relative Purchasing Power of Net Farm and Net Urban Income

O. C. Stine, Bureau of Agricultural Economics

Discussion: Leo Wolman, Columbia University
Murray W. Latimer, Railroad Retirement Board
John D. Black, Harvard University
Murray R. Benedict, University of California

TUESDAY, DECEMBER 29, 1936

—2:30 P.M.—

IV. INDICIA OF RECOVERY
(With American Economic Association)
Chairman: Willford I. King, New York University

Indicia of Recovery for the United States
Ernest S. Griffith, American University

Regional Barometers of Recovery
L. D. H. Weld, McCann-Erickson Inc., New York City

Indicia of Recovery for England
Thomas Ballough, University of London

Indicia of Recovery for Sweden
James D. Magee, New York University

—5:00 P.M.—

SECTION COMMITTEE MEETING
Committee on Biometrics and Vital Statistics

—6:00 P.M.—

DINNER MEETING OF FELLOWS OF THE AMERICAN STATISTICAL ASSOCIATION
Chairman: Joseph S. Davis, Food Research Institute

Introduction of Newly-Elected Fellows
W. L. Crum, Harvard University

The Association and the Statistical Profession
Edmund E. Day, The Rockefeller Foundation

—8:00 P.M.—

PRESIDENTIAL ADDRESSES
Chairman: Walter F. Willcox, Cornell University

Statistics and Social Engineering
Joseph S. Davis, American Statistical Association

The Political Interpretation of History
Arthur N. Holcombe, American Political Science Association

Business as an Institution
Henry Fairchild, American Sociological Society

The Interstate Commerce Worker and Social Security
Joseph P. Chamberlain, American Association for Labor Legislation

The Economist in a World of Transition
Alvin S. Johnson, American Economic Association

WEDNESDAY, DECEMBER 30, 1936

—9:00 A.M.—

ANNUAL BUSINESS MEETING
Election of Officers

—10:00 A.M.—

I. NON-TECHNICAL EXPOSITORY PAPERS ON MATHEMATICAL STATISTICS
(With the Institute of Mathematical Statistics)
Chairman: Henry L. Rietz, University of Iowa

Recent Advances in Mathematical Statistics
Paul R. Rider, Washington University

The Analysis of Sets of Correlated Variates
Harold Hotelling, Columbia University

Discussion: Allen T. Craig, University of Iowa
S. S. Wilks, Princeton University

II. INVESTIGATIONS OF FAMILY EXPENDITURES
Chairman: Horatio M. Pollock, New York State Department of Mental Hygiene

Methods of Analyzing Families by Type with Respect to Consumption
Day Monroe, Bureau of Home Economics

The Measurement of Variations in Family Expenditures
Faith M. Williams, Bureau of Labor Statistics

Discussion: Hazel Kyrk, University of Chicago

III. SELECTED PAPERS
Chairman: Aryness Joy, Central Statistical Board

A Statistical Study of Average and Marginal Cost
Joel P. Dean, Indiana University

Methods Used in Strike Statistics
Florence Peterson, Bureau of Labor Statistics

A Balance Sheet of the Nation's Economy
Frank G. Dickinson, University of Illinois, and
Franzy Eakin, A. E. Staley Manufacturing Company

IV. VITAL STATISTICS
Chairman: Halbert L. Dunn, Bureau of the Census

An Application of Sampling Principles to the Theory of Simple Epidemics
Lowell J. Reed, The Johns Hopkins University

Effect of Residence Allocation on Death Rates
Forrest E. Linder, Bureau of the Census

The Intraindividual and Interindividual Variability of the Basal Metabolism in Normal Subjects
Joseph Berkson, Mayo Clinic

A Syphilis Morbidity Survey in New York State
G. H. Ramsey and Jacob Yerushalmy, New York State Department of Health

WEDNESDAY, DECEMBER 30, 1936

—10:00 A.M.—

V. CONFERENCE ON RELIEF STATISTICS
(Open Meeting of Joint Committee on Relief Statistics of American Public Welfare Association and American Statistical Association)
Chairman: Howard B. Myers, Works Progress Administration

—12:30 P.M.—

BOARD OF DIRECTORS

—2:30 P.M.—

I. RESEARCH ON CAUSES OF VARIATIONS IN FERTILITY
(With Population Association of America)
Chairman: P. K. Whelpton, Scripps Foundation for Population Research

Medical Aspects
Regine Stix, Milbank Memorial Fund

Economic Aspects
Faith M. Williams, Bureau of Labor Statistics

Social-Psychological Aspects
Leonard S. Cottrell, Jr., Cornell University

Demographic Aspects
Harold F. Dorn, U. S. Public Health Service

II. FOREIGN TRADE AND INTERNATIONAL PAYMENTS
Chairman: Donald M. Marvin, Royal Bank of Canada

The Problem of Measuring the Effects of Reciprocal Trade Agreements
E. Dana Durand, U. S. Tariff Commission

Statistical Methods in Balance of Payments Estimates
Amos E. Taylor, Bureau of Foreign and Domestic Commerce

Discussion: Henry Chalmers, Bureau of Foreign and Domestic Commerce
Joseph B. Hubbard, Harvard Business School
Emile Despres, Federal Reserve Bank of New York
Frank W. Fetter, Haverford College

III. PROGRAMS FOR THE STUDY OF COSTS AND PRICES IN AMERICAN INDUSTRIES
(Round Table with Conference on Price Research)
Chairman: Frederick C. Mills, Columbia University

Price Research in Textiles
(Report prepared by a committee of the Conference on Price Research, under the chairmanship of S. J. Kennedy)

Price Research in Steel
(Report prepared by a committee of the Conference on Price Research, under the chairmanship of Samuel S. Stratton)

Discussion: H. S. Davis, University of Pennsylvania
Ralph J. Watkins, University of Pittsburgh
Malcolm Sharp, University of Chicago
Willard L. Thorp, Dun and Bradstreet

WEDNESDAY, DECEMBER 30, 1936

—2:30 P.M.—

IV. STATISTICAL METHODS FOR EXPERIMENTAL DATA

Chairman: George W. Snedecor, Iowa State College

An Experiment Planned with Confounding in Incomple'e Blocks
W. J. Youden, Boyce Thompson Institute for Plant Research

Correlation Between Mean and Standard Deviation in Field Experiments
F. R. Immer, University of Minnesota

The Efficiency in Field Trials of Pseudo-Factorial and Incomplete Randomized Block Methods
C. H. Goulden, Dominion Rust Research Laboratory and Manitoba College of Agriculture

The Analysis of Variance and Covariance in Non-orthogonal Data
S. S. Wilks, Princeton University

V. ROUND TABLE ON UNEMPLOYMENT

(Invitational discussion group)

Chairman: Ewan Clague, Social Security Board

—6:00 P.M.—

DINNER MEETING: RETROSPECT AND PROSPECT

(Joint meeting with the Chicago Chapter of the American Statistical Association)

Chairman: Joseph S. Davis, President, American Statistical Association

Outlook for 1937
F. Leslie Hayford, General Motors Corporation

Prospect for 1937–41
Leonard P. Ayres, Cleveland Trust Company

MINUTES OF THE ANNUAL BUSINESS MEETING

The American Statistical Association convened for the annual business meeting at 9:00 A.M. on Tuesday, December 29, 1936, at the Stevens Hotel in Chicago. President Joseph S. Davis presided.

Reports were received from the following committees and representatives: the Joint Advisory Committee on the Census, the Committee on Census Enumeration Areas, the Joint Committee on Income Tax Statistics, the Committee on Statistics of Institutions for Mental and Physical Disorders, the Committee to Appraise the Statistical Evidence of the Causes of the 1929–1932 Business Collapse, the Committee on Relief Statistics, the Representative on the Business Research Council, the Representative on the Joint Committee for the Development of Statistical Applications in Engineering and Manufacturing, the Representative on the National Conference on Nomenclature of Disease, and the Representative on the Sectional Committee on Standards for Graphic Presentation.[1]

It was voted to approve for adoption at the next Annual Meeting a series of amendments to the Constitution of the Association which, when adopted, will make the Constitution read as follows:

CONSTITUTION

Article I—Name

This Association shall be denominated the American Statistical Association.

Article II—Objects

The objects of the Association shall be to collect, preserve, and diffuse statistical information in the different departments of human knowledge. To this end it is part of the purpose of this Association to conduct meetings and publish scientific papers, to promote the improvement of statistical data and technique, to foster contacts among persons seriously concerned with statistical information, problems, and methods, with a view to stimulating research and elevating the standards of statistical work, and to encourage the application of statistical science to practical affairs.

Article III—Membership

The membership of the Association shall consist of Regular Members, Fellows, Honorary Members, and Corporate Members.

Regular Members shall be persons interested in the objects of the Association, elected by vote of the Board of Directors, on nomination of one or more members.

Fellows shall be statisticians of established reputation, elected by unanimous vote of the Committee on Fellows as provided in Article IV. The number of Fellows shall not exceed one hundred and fifty at any time.

Persons distinguished in the field of statistics or of public service may be elected to honorary membership by unanimous vote of the Board of Directors.

Corporations and other organizations interested in the objects of the Association may be admitted to corporate membership by vote of the Board of Directors.

[1] See pp. 202–216.

Article IV—Committee on Fellows

There shall be a Committee on Fellows which shall survey the membership roll once each year and announce its election of Fellows, if any, at the Annual Meeting of the Association. The Committee on Fellows shall consist of five Fellows, one of whom shall be appointed by the retiring President at each Annual Meeting for a term of five years. Appointments to fill unexpired terms shall be made by the President as such vacancies occur. No Fellow may serve on the Committee for two full terms in immediate succession. The senior member of the Committee, in respect of continuous service, shall serve as its Chairman.

Article V—Officers

The officers of the Association shall be a President, a number of Vice-Presidents, a Secretary, a Treasurer, and an Editor. The duties of the officers shall be those usually devolving upon such officers except as may be otherwise provided by the By-Laws.

Each of the Vice-Presidents shall represent a distinct field of statistical interest. The number and fields of interest of the several Vice-Presidential offices shall be fixed in accord with the provisions of the By-Laws. The Vice-Presidents shall advise the President and Secretary in the preparation for annual and special meetings and in other matters concerning the interests of the groups they respectively represent in the membership of the Association. In case of the incapacity of the President to perform the duties of his office on any occasion, the Secretary shall designate which of the Vice-Presidents shall act as President.

Article VI—Board of Directors

There shall be a Board of Directors for the government of the Association consisting of the President, the Secretary and six elected Directors. The Secretary shall call a meeting of the Board of Directors on request of the President or any three Directors and shall notify the Directors of such meeting at least seven days in advance. Three Directors shall constitute a quorum at any meeting regularly convened.

Article VII—Elections

The officers of the Association other than the Editor shall be elected each year at the Annual Meeting and shall serve until the close of the Annual Meeting at which their successors are elected. The Editor shall be appointed by the Board of Directors. The six elected Directors shall be elected for terms of three years each, two of which terms shall expire at the close of each Annual Meeting. No elected Director may serve two terms in immediate succession. The Board of Directors shall fill vacancies in any office and in its own membership until the next Annual Meeting.

The President shall appoint a Nominating Committee of three members, the personnel of which shall be announced to the membership at least three months before the Annual Meeting. At least thirty days before the Annual Meeting the Nominating Committee shall report to the membership its nominations of Officers and Directors to be elected at the next Annual Meeting.

Twelve or more Regular Members or Fellows may make nominations for any office by submitting a signed petition to the Secretary of the Association not less than twenty-four hours before the beginning of the business meeting at which the election is scheduled to take place. In case a nomination by petition is made, the

Nominating Committee may present to the Annual Meeting the names of one or more additional nominees for the same office.

When but one person has been nominated for a given office, that person may be elected at the Annual Meeting by a *viva voce* vote. If there are two or more nominations for the same office, it shall be the duty of the Secretary to announce such nominations. In the latter case, the election for this office shall be by secret ballot, and the President shall appoint three judges of election who shall count the ballots. The judges of election shall decide any questions that may arise as to the validity of any ballot, and shall declare the results of the election. The candidate who receives a plurality of the votes cast for that office shall be declared elected. The President shall vote only in case of a tie vote, in which event he shall cast the decisive ballot.

Article VIII—Meetings

Annual and occasional meetings of the Association shall be held at such times and places as the Board of Directors may designate. The President shall have direct charge of the general program of such meetings with the assistance and advice of the Vice-Presidents and Secretary.

Article IX—Sections

The Board of Directors may establish a Section for any field or fields of statistical specialization when such action promises to advance the objects of the Association. For each Section there shall be a Section Committee appointed by the Board of Directors or elected by the members affiliated with the Section as the Board of Directors may determine. Regular Members and Fellows may affiliate themselves with one or more Sections under regulations established by the Board of Directors. Each Section shall be empowered to engage in such activities as the Board of Directors may authorize. The Board of Directors may combine, divide, or dissolve Sections, or revise their respective fields, whenever such action is recommended by the Section Committee or Committees involved or by the members at an Annual Meeting.

Article X—Chapters

The Board of Directors may establish a Chapter of the Association in any city or geographic district when such action promises to advance the objects of the Association. The Board of Directors shall formulate requirements concerning chapters. It may dissolve any Chapter when such action appears to be in the interest of the Association.

Article XI—Resolutions

No resolution requesting, advocating, commending, or condemning any action or proposed action, not arising out of the activities of the Association, shall be submitted to the Association for a vote unless the resolution shall first have been approved by the Board of Directors of the Association.

Article XII—Amendments

Amendments to this Constitution may be proposed by any member of the Association at the Annual Meeting, and if supported by at least one-third of the members present and voting shall be submitted to the next Annual Meeting, where a two-thirds vote of all members present and voting shall be required for adoption.

Amendments to the By-Laws of the Association were adopted making the By-Laws read as follows:

BY-LAWS

1. At least one month in advance of each Annual Meeting the Secretary shall mail to each member of the Association a notice of the time, place and program of the meeting. At suitable intervals the Secretary shall publish the Constitution and By-Laws and a membership roll. A copy shall be supplied to each member.

2. Regular Members and Fellows shall pay annual dues of $5.00 payable at the beginning of the calendar year. Regular Members and Fellows who choose to pay $25.00 or more in any year shall be designated as Contributing Members. Corporate Members shall pay dues of $100.00 per annum payable at the beginning of the period covered.

If two members are husband and wife, one of them may elect to pay annual dues of $2.00 in which case he shall not receive the publications and notices which are sent to other members.

Upon the written request of any Regular Member or Fellow and the payment of $100.00, the Board of Directors may designate such Regular Member or Fellow as a Life Member without altering his previous status except to exempt him from payment of annual dues.

Honorary Members shall not be required to pay annual dues. The Board of Directors may, in its discretion, exempt a Regular Member or Fellow from the payment of annual dues for such a period as it designates.

3. Each Corporate Member may designate two representatives. In addition to their status as Corporate Representatives, persons so appointed shall enjoy all the rights and privileges of individual members. Corporate Representatives shall not be required to pay annual dues.

4. No resolution requesting, advocating, commending, or condemning any action or proposed action, not arising out of the activities of the Association, shall be submitted to the Association for a vote unless the resolution shall first have been approved by the Board of Directors of the Association.[2]

5. All funds of the Association shall be deposited with the Treasurer and disbursements therefrom shall be made by the Treasurer under such regulations as the Board of Directors may establish.

There shall be a Committee on Investments composed of three to five Regular Members or Fellows appointed by the Board of Directors to supervise the investment and reinvestment of such funds as the Board of Directors may designate. The Treasurer shall have authority to purchase securities with the funds that the Board of Directors has designated for investment, and to sell such securities, but such purchases and sales shall be made only on the written order of the majority of the Committee on Investments signed by two members of the Committee.

The fiscal year shall be the calendar year. The Treasurer shall make a detailed financial report to the Board of Directors within thirty days after the end of each fiscal year. The Treasurer's report shall be audited by an Auditing Committee appointed by the President before the expiration of his term of office. The report of the Auditing Committee shall be published with the Treasurer's report in the *Journal*.

[2] When these amendments were presented it was pointed out that upon the adoption of the amendments to the Constitution, a By-Law specifying the fields of interest to be represented by the Vice-Presidents should be substituted for By-Law 4.

6. The Association shall publish a journal under the title *Journal of the American Statistical Association* and such other publications as may be useful in advancing the objects of the Association. The Board of Directors shall appoint five Associate Editors to aid the Editor in editing the *Journal*.

7. Except as otherwise specified by the Constitution and By-Laws or action of the Board of Directors, all committee appointments shall terminate on March 31 of each year.

8. The Board of Directors may appoint one or more District Representatives to promote the objects of the Association in designated geographic districts or regions.

9. These By-Laws may be amended at any Annual Meeting of the Association by a two-thirds vote of the members present and voting.

Walter F. Willcox, presenting the report of the committee to arrange for a meeting of the International Statistical Institute in the United States in 1939 at the time of the centenary meeting of the American Statistical Association, stated that the Federal Government's invitation had been extended at the recent Athens meeting of the Institute by the U. S. Minister to Greece and gladly accepted. He also expressed the hope that arrangements could be made for a centennial history of the American Statistical Association, which might perhaps be enlarged to cover the history of Federal statistics for the 150 years of its history. It was voted to authorize the Board of Directors until the next annual meeting to act upon this proposal.

The business meeting was adjourned until 9:00 A.M., December 30, 1936.

The business meeting was resumed at 9:00 A.M., December 30, 1936, in the Stevens Hotel in Chicago. Vice-President F. Leslie Hayford presided.

The reports of the Secretary-Treasurer were presented in preliminary form subject to minor revisions at the end of the fiscal year. The Editor's report was presented.

The report of the Committee on Nominations was presented as follows:

President: W. RANDOLPH BURGESS

Vice-Presidents:

Collection and Classification of Data and Administration of Statistical Agencies

FAITH M. WILLIAMS

Statistical and Actuarial Methods and Technique, and the Teaching of Statistics

BURTON H. CAMP

Facts and Methods Pertaining to Political Science, Sociology, Social Welfare Problems, and Vital Statistics

SAMUEL A. STOUFFER

Facts and Methods Related to Anthropology, Biometry, Psychology, and Education

HALBERT L. DUNN

Facts and Methods Bearing upon Economics and Economic Theory
ALVIN H. HANSEN

Facts and Methods Pertaining Primarily to Business
DONALD R. BELCHER

Facts and Methods Pertaining to Financial Institutions
CASIMIR A. SIENKIEWICZ

Facts and Methods Pertaining to Marketing
JOHN H. COVER

Directors: (For terms expiring at the close of the Annual Meeting in 1939.)
MORRIS A. COPELAND
JOSEPH S. DAVIS

Secretary-Treasurer: FREDERICK F. STEPHAN

Editor of the Journal: FREDERICK F. STEPHAN

The Secretary was instructed to cast one ballot for the candidates nominated. The ballot was cast and the nominees were duly elected.

W. L. Crum reported that the Committee on Fellows had elected the following Fellows: Burton H. Camp, Morris A. Copeland, and Paul R. Rider.

Reports were received from the following committees and representatives: the Committee on Labor Statistics, the Committee on an Annual Review of Progress in Mathematical Statistics, the Committee on Sociometrics, the Committee to Stimulate and Coordinate Research, the Representative on the Board of Directors of the National Bureau of Economic Research, the Representative on the Conference on National Income and Wealth, and the Representatives on the Social Science Research Council.[3]

The following resolutions were adopted:

RESOLVED that the members of the American Statistical Association deeply appreciate the leadership that President Joseph S. Davis has given them during 1936 and record a very hearty vote of thanks to him, and to the Vice-Presidents who assisted him, for the very excellent program of this Annual Meeting.

RESOLVED that the American Statistical Association expresses its gratitude and appreciation to Dr. Donald R. G. Cowan, its Representative on the Joint Committee on Local Arrangements, and to Professor Garfield V. Cox, Chairman of that Committee, for their great services in making the local arrangements essential to the success of this Annual Meeting.

RESOLVED that the American Statistical Association warmly thanks the management and employees of the Stevens Hotel for the comfort and care that the members of the Association have enjoyed at this Annual Meeting.

The meeting was adjourned.

FREDERICK F. STEPHAN, *Secretary*

[3] See pp. 205–216.

Report of the Secretary

During 1936 the Secretary's office has continued to extend the activities mentioned in the report for 1935 and has assisted the officers and committees in their work. A *Bulletin* was developed on an experimental basis in order to provide a medium for various notices and communications and for informal discussion by members of professional problems and Association affairs. This *Bulletin* is not yet filling the place that it is intended to fill, but substantial progress has been made toward that goal.

The year was a very successful one for the Chapters. Their interesting meetings are reported in a special section in each issue of the Journal. There were 54 Chapter meetings during the year. Representatives from ten Chapters met with the Board of Directors at the Annual Meeting in Chicago for a discussion of Chapter programs and the relationship of the Association to its Chapters.

The membership of the Association increased during the year by 124 members. In 1936, 216 new members were elected and 27 former members were reinstated. Seventy-eight members were removed from the membership list for failure to pay their dues of whom 23 were reinstated before the end of the year. Fifty-four members were lost by resignation and ten by death. At the end of the year the Board of Directors had approved 21 applications for membership to begin January 1, 1937.

The following deaths were recorded during the year: Honorary Members, Karl Pearson and Harold Ludwig Westergaard; Fellows, John Cummings, Malcolm C. Rorty, I. M. Rubinow, and Edgar Sydenstricker; and Regular Members Florence DuBois, Harkness G. Hard, Richard Wallace Schabacker, and Caroline E. Wilson.

Membership Statement, December 31, 1936

Honorary members		19
Corporate members		5
Fellows:		
Contributing member	1	
Life members	8	
Other Fellows	77	86
Regular members:		
Life members	22	
Other regular members	1,743	1,765
Total membership		1,875

The number of subscribers increased from 521 at the end of 1935 to 536 at the end of 1936.

Frederick F. Stephan, *Secretary*

Report of the Treasurer

During 1936 there was a substantial increase in receipts from dues as a result of the growth in membership during the year. Expenditures for Journal printing were reduced sharply because no Handbook was published in 1936 and because there was a reduction of more than $200 in orders from authors for reprints. Exclusive of the purchase and sale of securities, cash receipts exceeded cash expenditures by $1,311.35. However, at the end of the fiscal year there was an unpaid bill for travel expense amounting to $76.55 and the bill for the reprints for the December Journal amounting to approximately $165.00 had not been received. Of this excess of receipts over expenditures $63.70 is carried forward as the balance in the special account for The Rockefeller Foundation grant.

Investments are shown on the balance sheet at market value at the end of the fiscal year with cost figures for comparative purposes. The latter figures include the cost of certain shares of stock acquired during 1892 and 1893, the market value of which on December 31, 1936, was approximately $1,000 less than cost. During the year approximately $3,300 was invested in addition to the proceeds of securities sold during the year.

Comparative balance sheets and a statement of receipts and expenditures are attached.

Frederick F. Stephan, *Treasurer*

AMERICAN STATISTICAL ASSOCIATION
COMPARISON OF BALANCE SHEETS

	December 31, 1935		December 31, 1936	
ASSETS				
Current Assets and Investments:				
Cash				
Checking account (American Security and Trust Company)	$1,994.35		$ 13.21	
Savings account (Emigrant Industrial Savings Bank)	359.44		366.66	
Petty cash	13.86	$ 2,367.65	0.00	$ 379.87
Investments		8,099.00*		13,874.25†
Receivables				
Accrued interest	$ 16.79		$ 26.83	
Accounts receivable	67.50		75.95	
Dues receivable, less doubtful items	150.00	234.29	100.00	202.78
Inventories				
Journal	$1,500.00		$1,500.00	
Special publications	35.00	1,535.00	35.00	1,535.00
Furniture and Equipment, less depreciation		648.18		575.05
Total assets		$12,884.12		$16,566.95
LIABILITIES AND SURPLUS				
Current Liabilities:				
Unearned income				
Dues	$ 795.91		$ 912.93	
Subscriptions	1,608.00		1,452.50	
Miscellaneous credits	29.33	$ 2,433.24	3.08	$ 2,368.51
Bills payable		0.00		76.55
Special account, The Rockefeller Foundation Grant		0.00		63.70
Life Memberships		1,980.00		2,030.00
Corporate Surplus		8,470.88		12,028.19
Total liabilities and surplus		$12,884.12		$16,566.95

* Market value, December 31, 1935. Cost $9,017.60.
† Market value, December 31, 1936. Cost $12,893.51.

AMERICAN STATISTICAL ASSOCIATION
STATEMENT OF RECEIPTS, EXPENDITURES, AND CASH BALANCES

December 31, 1935 to December 31, 1936

Cash on hand, December 31, 1935:		
Checking account (American Security and Trust Company)	$ 1,994.35	
Savings account (Emigrant Industrial Savings Bank)	359.44	
Petty Cash	13.86	$ 2,367.65
Net cash receipts, December 31, 1935 to December 31, 1936:		
General account	$19,381.79	
Special account: The Rockefeller Foundation Grant	7,500.00	26,881.79
Total		$29,249.44
Net cash expenditures, December 31, 1935 to December 31, 1936:		
General account	$21,433.27	
Special account: The Rockefeller Foundation Grant	7,436.30	$28,869.57
Cash on hand, December 31, 1936:		
Checking account (American Security and Trust Company)	$ 13.21	
Savings account (Emigrant Industrial Savings Bank)	366.66	379.87
Total		$29,249.44

AMERICAN STATISTICAL ASSOCIATION
STATEMENT OF CASH RECEIPTS AND EXPENDITURES

December 31, 1935 to December 31, 1936

	General Account	Special Account: The Rockefeller Foundation Grant	Total
Receipts:			
Dues	$ 9,646.92	—	$ 9,646.92
Subscriptions	3,039.29	—	3,039.29
Advertising	356.69	—	356.69
Reprints	232.30	—	232.30
Journal sales	245.80	—	245.80
Special publications	36.95	—	36.95
Dividends and interest	712.42	—	712.42
Other receipts	73.24	—	73.24
The Rockefeller Foundation Grant	—	$7,500.00	7,500.00
Total receipts, exclusive of sale of securities	$14,343.61	$7,500.00	$21,843.61
Sale of securities	5,038.18	—	5,038.18
Total receipts	$19,381.79	$7,500.00	$26,881.79
Expenditures:			
JOURNAL: Printing, mailing and reprints	$ 4,610.40	—	$ 4,610.40
Bulletin	158.81	$ 207.26	366.07
Salaries and wages	6,317.23	4,905.00	11,222.23
Rent	288.00	792.00	1,080.00
Office supplies, printing and mimeographing	722.62	170.85	893.47
General postage and carriage	439.27	65.00	504.27
Telephone and Telegraph	100.00	52.43	152.43
Travel expense: Officers	—	817.69	817.69
Travel expense: Committees	—	282.62	282.62
Furniture and equipment	28.35	—	28.35
Old JOURNALS purchased	42.08	—	42.08
Storage of old JOURNALS	125.62	—	125.62
Other expense	263.58	143.45	407.03
Total expenditures, exclusive of purchase of securities	$13,095.96	$7,436.30	$20,532.26
Purchase of securities	8,337.31	—	8,337.31
Total expenditures	$21,433.27	$7,436.30	$28,869.57

Report of the Auditing Committee

We have examined the balance sheet of the American Statistical Association as of December 31, 1936, verified the cash, and checked the securities on hand. We have also examined the statement of receipts and expenditures.

In our opinion the balance sheet is a correct statement of the financial condition of the Association and the receipts and expenditures statements are duly supported by accompanying vouchers.

Spurgeon Bell
D. C. Elliott

Report of the Editor

Volume 31 of the *Journal of the American Statistical Association* was published in 1936. The customary *Proceedings Supplement* was incorporated in the March issue. The number of pages devoted to the publication of papers delivered at the Annual Meeting was almost exactly equal to the average over the four preceding volumes, but a larger proportion of these papers was published in the June, September, and December numbers. The volume totaled 820 pages, 34 pages more than the preceding volume, exclusive of the 1935 *Handbook*. A considerably larger number of pages than usual was devoted to reviews.

The quality of the contents of the volume just completed is due to the efforts of the Review Editor, Ralph J. Watkins, to the authors of articles, the contributors of notes, the reviewers, and the many members who acted as editorial advisers.

Frederick F. Stephan, *Editor*

LIST OF COMMITTEES FOR 1936

RESEARCH COMMITTEES

Committee to Stimulate and Coordinate Research

Meredith B. Givens, *Chairman*
Morris A. Copeland
W. Leonard Crum
Neva R. Deardorff
Howard W. Green
Horatio M. Pollock
Paul R. Rider
Winfield W. Riefler
Thorsten Sellin
Casimir A. Sienkiewicz
Willard L. Thorp
Mary van Kleeck
(The President, *ex officio*, the Secretary and the Chairmen of all the Research Committees.)

Committee on Government Statistics and Information Services[1]

Frederick C. Mills, *Chairman*
M. B. Givens, *Executive Secretary*
Donald R. Belcher
Murray R. Benedict
William J. Carson
Robert E. Chaddock
Ewan Clague
J. Frederic Dewhurst
Bryce M. Stewart
Samuel A. Stouffer
Ralph J. Watkins

[1] Continued on inactive status pending publication of report.

Committee on Census Enumeration Areas

Howard W. Green, *Chairman*
Clarence E. Batschelet
Robert E. Chaddock
Neva R. Deardorff
Calvert L. Dedrick
R. D. McKenzie
Leon Truesdell

Committee on Statistics of Delinquents and Criminals

Thorsten Sellin, *Chairman*
Morris Ploscowe, *Secretary*
Charles E. Clark
G. E. Gehlke
R. R. Lutz
Bennet Mead
Barkev S. Sanders
Edwin H. Sutherland
George Vold

Joint Committee on Income Tax Statistics (with American Economic Association)

W. L. Crum, *Chairman*
David Friday
Simon Kuznets

Committee on Industrial Statistics

Willard L. Thorp, *Chairman*
Charles A. Bliss
C. R. Chambers
Stephen M. DuBrul
Joseph B. Hubbard
Leonard Kuvin
Howard H. McClure
Claudius Murchison

Committee on Labor Statistics

Casimir A. Sienkiewicz, *Chairman*
Ewan Clague
Carroll R. Daugherty
O. A. Fried
Meredith B. Givens
Gladys L. Palmer
Eugene B. Patton
William H. Stead
Sidney W. Wilcox

Committee on Statistics of Institutions for Mental and Physical Disorders

Horatio M. Pollock, *Chairman*
G. W. Baehne
Frederick W. Brown
Kate H. Claghorn
Mary Augusta Clark
Emil Frankel
Carl E. McCombs
David M. Schneider

Committee on Statistics of Relief and Child Care[2]

Neva R. Deardorff, *Chairman*
F. Stuart Chapin
Emil Frankel
Ralph G. Hurlin
Maurice J. Karpf
Philip Klein
David M. Schneider
Maude E. Stearns
Emma Winslow
Helen Witmer

[2] Continued as two committees: the Committee on Relief Statistics and the Committee on Statistics of Dependent Children in Foster Care.

Committee on Relief Statistics[3]

Ralph G. Hurlin, *Chairman*
Neva R. Deardorff
Frederick F. Stephan
Paul Webbink

Committee on Statistics of Dependent Children in Foster Care

Neva R. Deardorff, *Chairman*

OTHER COMMITTEES AND REPRESENTATIVES

Committee on Fellows

W. L. Crum (*For the term expiring December 31, 1936*)
William F. Ogburn (*For the term expiring December 31, 1937*)
Emanuel A. Goldenweiser (*For the term expiring December 31, 1938*)
E. Dana Durand (*For the term expiring December 31, 1939*)
Walter A. Shewhart (*For the term expiring December 31, 1940*)

Committee on Nominations

Robert E. Chaddock, *Chairman*
Leonard P. Ayres
Meredith B. Givens

Committee on Finance

Frederick R. Macaulay, *Chairman*
Willford I. King
Dean Langmuir

Committee on Association Policy

Joseph S. Davis
Frederick C. Mills
Frederick F. Stephan

Committee to Arrange for a Meeting of the International Statistical Institute in the United States in 1939

Walter F. Willcox, *Chairman*
E. Dana Durand
Haven Emerson
Stuart A. Rice
(The President and Secretary, *ex officio*)

Committee to Appraise the Statistical Evidence of the Causes of the 1929–1932 Business Collapse

W. I. King, *Chairman*
Seymour L. Andrew
Leonard P. Ayres
William A. Berridge
Robert W. Burgess
Paul T. Cherington
John H. Cover
Garfield V. Cox
Carroll W. Doten
George J. Eberle
J. F. Ebersole
Ralph C. Epstein
Alfred T. Falk
Irving Fisher
F. Leslie Hayford
Stanley B. Hunt
Harry Jerome
Edwin W. Kemmerer
Wesley C. Mitchell
Otto Nathan
Frank A. Pearson
Horatio M. Pollock
John R. Riggleman
George B. Roberts
Norman J. Silberling
Laurence H. Sloan
Bradford B. Smith
Carl Snyder
Ralph J. Watkins
Ray B. Westerfield
Edwin B. Wilson
Leo Wolman

[3] Authorized to act with the Committee on Statistical Forms and Procedures of the American Public Welfare Association as a Joint Committee on Relief Statistics.

Committee on Biometrics and Vital Statistics

Lowell J. Reed, *Chairman*
Joseph Berkson
Robert E. Chaddock
Selwyn D. Collins
John Collinson
J. V. DePorte
Harry H. Laughlin
Alfred J. Lotka
Hugo Muench, Jr.
Richard E. Scammon
Edgar Sydenstricker[4]

Committee on Sociometrics

George A. Lundberg, *Chairman*
F. Stuart Chapin
Calvert L. Dedrick
Stuart A. Rice
Samuel A. Stouffer
Dorothy S. Thomas
George B. Vold

Committee on Special Publications

Frederick F. Stephan, *Chairman*
Meredith B. Givens
Paul R. Rider
Frank A. Ross

State Committee for Pennsylvania

Ewan Clague, *Chairman*
William J. Carson
Casimir A. Sienkiewicz

Committee on an Annual Review of Progress in Mathematical Statistics

Paul R. Rider, *Chairman*
Burton H. Camp
Samuel S. Wilks

Representative on the Board of Directors of the National Bureau of Economic Research

Winfield W. Riefler

Representatives on the Joint Advisory Committee on the Census

Willford I. King (*For the term expiring December 31, 1936*)
Paul T. Cherington (*For the term expiring December 31, 1937*)
Robert E. Chaddock (*For the term expiring December 31, 1938*)

Members of the Social Science Research Council

Seymour L. Andrew (*For the term expiring December 31, 1936*)
Edwin B. Wilson (*For the term expiring December 31, 1937*)
William A. Berridge (*For the term expiring December 31, 1938*)

Representative on the Council of the American Association for the Advancement of Science

William F. Ogburn

Representative on the Business Research Council

Donald R. Belcher

[4] Deceased.

Representative on the National Conference on Nomenclature of Disease
George H. Van Buren

Representative on the Joint Committee for the Development of Statistical Applications in Engineering and Manufacturing
Walter A. Shewhart

Representative on the Sectional Committee on Standards for Graphic Presentation
A. H. Richardson

Representative on the Conference on National Wealth and Income
Aryness Joy

REPORTS OF COMMITTEES AND REPRESENTATIVES

REPORT OF THE COMMITTEE ON FELLOWS

The Committee on Fellows has elected by unanimous vote the following Fellows: Burton H. Camp, Morris A. Copeland, and Paul R. Rider.

W. L. CRUM
WILLIAM F. OGBURN
EMANUEL A. GOLDENWEISER
E. DANA DURAND
WALTER A. SHEWHART

REPORT OF THE JOINT ADVISORY COMMITTEE ON THE CENSUS

The only meeting of the Joint Census Advisory Committee in the year 1936, was held at Washington on November 13 and 14. All members of the Committee were present with the exception of W. F. Ogburn, who had been appointed to fill the vacancy created by the resignation of E. E. Day, but was in Europe at the time of this meeting. R. E. Chaddock was elected temporary chairman.

The first day of the meeting was devoted mainly to acquainting the Committee with the progress and condition of work in the various divisions of the Bureau. This included a visit to the machine shop and an opportunity to see the latest improvements in the Bureau's tabulating and photostating equipment.

Of special interest to the Committee was the report of what had been done in regard to estimating population. It will be remembered that at the last previous meeting of the Committee, held in November, 1935, a resolution was adopted recommending that the Bureau should continue to accept the responsibility for making estimates covering individual cities having 10,000 or more inhabitants, counties or groups of counties, the rural population of states, and the population of cities of 2,500 to 10,000 in each state as a group—recommendations which closely followed those previously

adopted by the Special Advisory Committee on Vital Statistics in conference with representatives of the Population Association of America. It is generally recognized that the methods of estimating formerly used can no longer be applied. For the country as a whole satisfactory estimates can be made on the basis of registered births and deaths and immigration data; and fairly satisfactory estimates for states have been made based mainly on school enrollment figures. Some progress was being made on estimating for cities when the work was interrupted by the loss of three expert assistants who, one after the other, left the Bureau to accept more attractive positions elsewhere. The Bureau had not found it possible to replace them, and had no funds that could be applied to this work. The general conviction was that no satisfactory solution of this problem of making estimates is possible until there is a quinquennial census of population.

The following resolutions embody the views and conclusions of the Committee:

> WHEREAS, estimates of population are necessary for the computation of birth rates, death rates, and other rates or per capita figures; and
>
> WHEREAS, without such rates the annual compilations of data relating to births, deaths, prisoners, the insane or mentally diseased in institutions, criminal court cases, taxation, public debts, revenues, and expenditures, and other compilations which are being made by the Bureau of the Census under authorization of Congress, lose much of their value; and
>
> WHEREAS, the Bureau of the Census has always found itself unable to make fairly satisfactory estimates for more than six or seven years after the last preceding census;
>
> BE IT RESOLVED that the Committee strongly recommends a 5-year census of population; and also recommends that the Bureau of the Census seek sufficient funds to enable it to carry on research and experiments in estimating population with a view to devising methods more satisfactory than any hitherto used.

The Director of the Census outlined the plans that were being made for taking the Sixteenth Decennial Census in 1940 and submitted the tentative draft of a bill prepared within the Bureau covering that census and providing also for a quinquennial census of business and a quinquennial (or possibly biennial) census of manufactures, with annual compilations of data bridging the intervals between censuses. After some discussion the Committee concluded that they could not do better than to reaffirm the resolution adopted at the previous meeting of the Committee, which is as follows:

> RESOLVED that the Committee favors a quinquennial census covering population, agriculture, and such other related subjects as it may be desirable to include, scheduled for the years ending in "0" and "5"; also a quinquennial census of manufactures, mines and quarries, power units, communication, transportation agencies, trade, and services for the years ending in "2" and "7"; also the plan of making such annual compilations as will preserve the continuity of the data obtained in the quinquennial censuses and administer to the needs of other governmental and private agencies by the more frequent reporting of some of the basic data.

The Director stressed the importance of making adequate preparations for the decennial census of 1940 and of beginning the preparations without

delay, stating that in the past they were not begun early enough, the result being that the Bureau found itself not fully prepared when the date of the census arrived. In that connection he asked the Committee for an expression of views regarding the project for a census of unemployment to be taken this coming year. The prevailing opinion was that such a census was not to be recommended, that it would not yield data of any practical value in relation to unemployment relief, and that owing to the difficulty and uncertainty in defining unemployment the data secured would be at variance with other measures of unemployment and would therefore result in a new source of confusion. The information really needed, it was contended, could best be secured in connection with a census of population containing detailed data regarding occupations and employment status. The Committee realizing that information of this kind was needed for relief work and in carrying out the social security legislation, believed that it should be included in the population schedule of 1940, but felt that any special census of population taken before that time would seriously interfere with or forestall the regular decennial census. The views of the Committee were summarized in the following resolution:

> WHEREAS, various undertakings by Federal, state, and local governments in the fields of unemployment relief and social security demand detailed data concerning occupations and employment status obtainable only in connection with a census of population; and
>
> WHEREAS, a census of population taken prior to 1940 would seriously interfere with, even if it did not preclude the taking of the regular decennial census of 1940; and
>
> WHEREAS, this Committee believes that a census of unemployment would not yield any data of practical use;
>
> BE IT RESOLVED that this Committee is of the opinion that additional data needed in relation to occupations and employment should be included in the decennial census of 1940; and that no census of unemployment or of population and unemployment should be undertaken prior to the regular decennial census.

The Committee was introduced to the new Chief Statistician for Financial Statistics of Cities, C. E. Rightor, who outlined briefly the situation in that branch of the Bureau's work. There was not time for anything like adequate consideration of this subject, but the Committee without hesitation adopted a resolution recommending that the collection of financial statistics for cities be extended to cover, as it did formerly, all cities of over 30,000; and that the collection of financial statistics of states, discontinued in 1933, be resumed.

ROBERT E. CHADDOCK, *Temporary Chairman* PAUL T. CHERINGTON WILLFORD I. KING	Representing the American Statistical Association
GEORGE E. BARNETT LEO WOLMAN	Representing the American Economic Association

REPORT OF THE COMMITTEE ON AN ANNUAL REVIEW OF PROGRESS IN MATHEMATICAL STATISTICS

The chairman of the committee was in London during the year 1935–1936 and was authorized to confer with Dr. J. O. Irwin who edits the annual survey of "Recent Advances in Mathematical Statistics" for the Royal Statistical Society, and to endeavor to arrange for cooperation between that Society and the American Statistical Association in the preparation of a joint review. For a time it seemed that such a review would be favored by the Royal Statistical Society, but the final decision was against it, at least for the present.

The Royal Statistical Society however would apparently be willing to consider a joint scheme for preparing short abstracts of papers, contributed as far as possible by authors themselves, subject to editorial supervision.

The committee is considering further what is best to be done under the circumstances, and can report progress.

PAUL R. RIDER, *Chairman*

REPORT OF THE COMMITTEE TO APPRAISE THE STATISTICAL EVIDENCE OF THE CAUSES OF THE 1929–1932 BUSINESS COLLAPSE

On May 16, 1936, the Board of Directors of the American Statistical Association authorized the formation of a Committee to Appraise the Statistical Evidence of the Causes of the 1929–1932 Business Collapse. This Committee was constituted because of the feeling on the part of some members of the Board that, at the present time, a considerable number of statistical facts relating to the causes of depression have been so thoroughly established that they are accepted by a large majority of leading members of the statistical fraternity. It was felt that, if this condition should prove to be true, a public service might be rendered by ascertaining just what statistical evidence is so accepted. With this end in view, a committee consisting of the following members was appointed:

WILLFORD I. KING, *Chairman*	J. F. EBERSOLE	HORATIO M. POLLOCK
SEYMOUR L. ANDREW	RALPH C. EPSTEIN	JOHN R. RIGGLEMAN
LEONARD P. AYRES	ALFRED T. FALK	GEORGE B. ROBERTS
WILLIAM A. BERRIDGE	IRVING FISHER	NORMAN J. SILBERLING
ROBERT W. BURGESS	F. LESLIE HAYFORD	LAURENCE H. SLOAN
PAUL T. CHERINGTON	STANLEY B. HUNT	BRADFORD B. SMITH
JOHN H. COVER	HARRY JEROME	CARL SNYDER
GARFIELD V. COX	EDWIN W. KEMMERER	RALPH J. WATKINS
CARROLL W. DOTEN	WESLEY C. MITCHELL	RAY B. WESTERFIELD
GEORGE J. EBERLE	OTTO NATHAN	EDWIN B. WILSON
	FRANK A. PEARSON	LEO WOLMAN

The present speaker was designated as Chairman of the Committee. The Committee was purposely made large in order to make it as representative as feasible of the statistical opinion of those members of the Association especially interested in questions relating to the business cycle.

Because of the size of the Committee, it did not seem feasible to make progress at a meeting unless steps could first be taken to clear the ground and determine what points of agreement existed and what differences were in need of discussion. As a preliminary measure, therefore, the Chairman sent out to the members of the Committee 18 specific propositions. Each one of these propositions was accompanied by charts, tables, or both, believed to assist materially in establishing the validity of the proposition. It was, of course, assumed that the members of the Committee would view the statistical evidence presented in the light of their knowledge of other statistical evidence and other events in general.

Each member of the Committee was requested to vote in one of three ways:

1. That the statistical evidence is adequate to establish the validity of the proposition.
2. That the validity of the proposition would be established, provided the proposition were amended in a way specified by the voter.
3. That the statistical evidence is not sufficient to establish the validity of the proposition. Each voter was asked to state his reasons for believing the evidence was insufficient.

As might be expected, considerable delay was experienced in securing returns from the members of the Committee. Up to the present time, 20 members have sent in their votes. On a few of the propositions, only 19 voted.

The propositions and the votes, as recorded by those voting up to the present time, were presented at a joint meeting of the American Economic Association, in the Ballroom of the Hotel Stevens, Chicago, on December 28th.

At a later date, it is expected that a complete report may be made to the Directors of the American Statistical Association.

WILLFORD I. KING, *Chairman*

REPORT OF THE COMMITTEE ON CENSUS ENUMERATION AREAS

The Committee on Census Enumeration Areas has been able to interest people in almost all the cities of a quarter of a million or more inhabitants in census tracts to the extent of preparing the necessary census tract maps for the approval of the Bureau of the Census. Practically all of these cities either have obtained official approval for their census tracts or are in the process of revising their maps so that approval may be gained.

The manual prepared by the Chairman of the Committee and Doctor

Leon E. Truesdell, committee member has aided people in various cities in preparing census tract maps and street indexes. The edition is entirely exhausted and the manual is in process of being rewritten for publication.

The Committee held a luncheon meeting Monday, December 28, 1936, to which were invited representatives of census tract cities all over the United States. Forty-two people were present. Representatives came from as far north as Duluth and as far south as New Orleans, and from San Francisco and New Haven.

The problems with which the Committee is still faced were discussed. These problems may be summarized as:

1. Creation of a broader use of census tract data within each census tract city: use by more organizations and in more different ways
   (a) By making census tract maps
   (b) By preparing and publishing a useable street index by which social and business data may be readily allocated to census tracts
   (c) By demonstrating a variety of possible local uses
2. Make definite recommendations relative to those table forms used in 1930 which have been found to be most useful, and those least useful from the standpoint of local community interests with a view to designing such forms for 1940 which will be most useable.

These problems are not yet solved but progress is being made towards their solutions.

It is believed valuable to continue the activities of this Committee for the promotion of the census tract idea both in new census tract cities and in those that have census tracts but have not taken full advantage of this "statistical tool."

HOWARD WHIPPLE GREEN, *Chairman*
C. E. BATSCHELET
ROBERT E. CHADDOCK
NEVA R. DEARDORFF
CALVERT L. DEDRICK
R. D. MCKENZIE
LEON E. TRUESDELL

REPORT OF JOINT COMMITTEE ON INCOME TAX STATISTICS

The Committee comprised Professo. Ebersole, Epstein and Haig for the American Economic Association and Crum, Friday and Kuznets for the American Statistical Association. After some exchange of ideas by correspondence in the early part of the year 1936, the committee came together for a general meeting at Columbia University on March 10. All members were present except Professor Ebersole and there were in addition Mr. Stephan, Secretary of the American Statistical Association and Dr. Director representing the Treasury Department. The Committee elected Crum chairman and undertook to discuss the various points, chiefly with reference to proposed changes in personal and corporation income tax forms, which had been under consideration by correspondence. As a result of the delibera-

tions, a memorandum of recommendations was agreed upon by the Committee and was submitted to Treasury officials. It is my belief that the changes recommended have largely been adopted by the Treasury.

No other meeting has been held since that of March 10, but that meeting authorized a sub-committee to give attention to the question of defining net income. This sub-committee, as a result of correspondence running through April and May, arrived at a recommendation as to such definition. Individual members of the Committee have at times consulted with Treasury officials on other matters relating to the interests of the Committee, but no further committee action was taken during the year.

I recommend that the Committee be continued for the coming year.

W. L. CRUM, *Chairman*

REPORT OF THE COMMITTEE ON INDUSTRIAL STATISTICS

The Committee on Industrial Statistics held its first meeting on November 11, 1936. The Committee feels that the immediate emergency has passed, so far as further serious curtailment of industrial statistics is concerned. However, it believes that the American Statistical Association should be vitally concerned with the improvement of the quality and quantity of industrial statistics. The Committee is therefore developing a long-run program to this end.

WILLARD L. THORP, *Chairman*

REPORT OF THE COMMITTEE ON RELIEF STATISTICS

The committee appointed by the Directors of the Association at the beginning of this year to exert such influence as it might toward improvement of relief statistics found in the Committee on Records and Statistics of the American Public Welfare Association another committee primarily interested in the problems of adequate statistical record of governmental relief operations. For several months the two committees worked in close cooperation. Later, with the consent of the two Associations, these committees decided to act as one on all matters within the scope of the assignment to this Association's committee, and adopted the designation, Joint Committee on Relief Statistics of the American Public Welfare Association and the American Statistical Association. This report is therefore submitted for and signed by the members of the joint committee.

The committee has met frequently during the year for general discussion and for planning specific activities. At the request of the Executive Director of the Social Security Board, it has acted as an official advisory committee to the Division of Public Assistance Statistics of the Board's Bureau of Research and Statistics. In this capacity it has advised on the general program of this Division and on the plans for monthly and annual statistics which it is collecting from state departments administering relief to the aged, the blind, and dependent children, under the public assistance provision of the

Social Security Act. At the request of the Division of Social Research of the Works Progress Administration, a sub-committee, consisting of Messrs. Webbink, Stephan, and Dr. Jeter, has been designated to advise that office concerning its new sample series of current relief statistics for rural and town areas. The committee is also represented by three members, Messrs. Hurlin, Webbink, and Stephan, on an Advisory Committee appointed jointly by the Works Progress Administration and the Social Security Board to supervise the collection from states of statistics of general relief administered through public offices.

The committee finds serious lack of integration in the statistical plans of numerous agencies of the federal government which are now responsible for the preparation of relief statistics and believes that steps should be taken to correlate the statistics which are being produced and to extend the reporting of statistics at several points at which there is now a dearth of information.

With the recent growth of relief operations, the number of persons engaged primarily in the compilation and analysis of relief statistics in federal, state, and city relief administrations has greatly increased. The committee has felt that an important service might be performed by providing means of exchange of information among these persons and others particularly concerned with the preparation and use of relief statistics. To this end two conferences for discussion of the problems of relief statistics were held during the year under the direction of the committee, one at Atlantic City in June in connection with the annual meeting of the National Conference of Social Work, the other in Washington, D. C., on December 12 in connection with meetings of the American Public Welfare Association. Both meetings were largely attended. A third such conference is to be held as part of the current annual meeting of this Association. Another activity of the committee has been the publication of an informal occasional bulletin, entitled "Bulletin of Information for Relief Statisticians." Prepared with the assistance of the Department of Statistics of the Russell Sage Foundation, four numbers of this bulletin were issued during the latter half of the year to a mailing list now including about 350 names and consisting primarily of persons working in the field of relief statistics or administrators of relief agencies.

The committee sees opportunity for further useful work along these lines and recommends that it be continued as a joint committee of the two Associations.

RALPH G. HURLIN, *Chairman*
PAUL WEBBINK, *Secretary*
NEVA R. DEARDORFF
EMIL FRANKEL
HARRY GREENSTEIN
HELEN R. JETER
HOWARD B. MYERS
FREDERICK F. STEPHAN

REPORT OF THE COMMITTEE ON STATISTICS OF DELINQUENTS AND CRIMINALS

The plan drafted last year for the development of a manual of uniform record-keeping and reporting of statistical data by judicial and penal agencies can progress no further until financial aid is available. A bibliography of the American literature on the theories, organization and function of criminal statistics is being prepared and an experiment is being made on the basis of Pennsylvania sources in developing an analytical index of the content of the tabulations in official series of state judicial and penal statistics. If this experiment proves successful, the report may serve as a model for similar indexes to the statistics of other states.

THORSTEN SELLIN, *Chairman*

REPORT OF THE COMMITTEE ON STATISTICS OF INSTITUTIONS FOR PHYSICAL AND MENTAL DISORDERS

During the past year your Committee has devoted its effort chiefly to cooperation with the American Hospital Association in the development of uniform statistics of general hospitals and out-patient services. Through conferences of representatives of several national organizations, including members of your Committee, the present status of the field has been surveyed and a beginning has been made in planning for such statistics. It is expected that in the coming year uniform definitions and statistical schedules will be devised which will meet the requirements of all agencies concerned. It is the opinion of your Committee that such statistical schedules should be adapted primarily for use by the U. S. Bureau of the Census, and the Committee will therefore work toward that end.

Your Committee has further considered the manual on hospital statistics adopted last year by the New York State Department of Social Welfare. The experience gained in the use of this manual will be of great service in the development of nationwide statistics of these institutions.

Through the effort of Frederick W. Brown, a member of your Committee who serves as a consultant to the Census Bureau, several noteworthy improvements have been made in the collection and compilation of statistics of institutions for mental defectives and epileptics. In general these improvements provide for the inclusion of more detailed data and for the separation of statistics of mental defectives from those of epileptics, both in the schedules as sent to institutions and the published reports. These changes have been approved by the Bureau of the Census and will be incorporated in the 1937 schedules.

Miss Mary Augusta Clark, a member of your Committee, submitted to the December meeting of the Committee a special report on clinic and dispensary statistics. This report makes a substantial contribution to the uniform system for which your Committee is working.

The Committee wishes to call the attention of the Association to the importance of encouraging the national Social Security Board to utilize its broad powers, to promote the establishment in each state and in the appropriate state department, of a statistical bureau which may gather and collate the great body of statistical information which will be developed out of the administration and operation of the Social Security Act. In the Committee's view, it would be extremely unfortunate if this great opportunity to establish a satisfactory statistical base for child care, old age assistance, institutional and other relief services should be missed. The Committee is convinced that the development on a national scale of satisfactory statistics in the social welfare field demands the establishment in each state of a competently directed, properly financed statistical bureau.

Your Committee wishes to call attention to the desirability of further realignment of the committees of the Association so that their activities may parallel more closely the administrative grouping of agencies and special services as set up by the federal government.

Your Committe again wishes to express its appreciation of the cooperative spirit continuously manifested by the officers of the Federal Census Bureau, and to commend the excellent work done by such Bureau in the collection and publication of institution statistics.

GEORGE W. BAEHNE
FREDERICK W. BROWN
KATE H. CLAGHORN
MARY AUGUSTA CLARK
EMIL FRANKEL
CARL E. MCCOMBS
DAVID M. SCHNEIDER
HORATIO M. POLLOCK, *Chairman*

COMMITTEE TO STIMULATE AND COORDINATE RESEARCH

The Committee has served as a conference and clearance group for the various research committee chairmen, and has served as an advisory committee to the Board of Directors during the past year. The annual reports of the various committees are now under review and a report and recommendations concerning research committee activities and personnel will be submitted to the Board at its March meeting. The Committee has held two meetings during the year.

A composite statement of research committee functions is being prepared for the Board. The possibility of Association activity in the field of civil judicial statistics is under consideration.

MEREDITH B. GIVENS, *Chairman*

REPORT OF THE REPRESENTATIVE ON THE JOINT COMMITTEE FOR THE DEVELOPMENT OF STATISTICAL APPLICATIONS IN ENGINEERING AND MANUFACTURING

During 1936 the committee has continued to act as a clearing house for information for engineers, manufacturers, and industrialists, on the one hand, and for those statisticians who wish to keep in touch with industrial problems on the other. Such service has been rendered not only to engineers and scientists in this country but also to committees and representatives of societies in other countries, particularly in the field of national and international standardization.

Eight types of problems have predominated this year. Six of these were the same as those listed in last year's report. The two new ones are: (a) fixing the meaning of, and methods for specifying, the accuracy and precision of methods of measurement, and (b) interpreting tests for significant differences.

Representatives of the committee, through the cooperation of the secretary of the American Statistical Association, have secured reports of work in similar fields in Russia, Poland, and England which have since appeared in the journal of the Association. When called upon, representatives of the committee have taken part in the discussion of applications of statistics at the meetings of certain engineering and management societies and at the meeting of the World Power Conference held in Washington this year.

Because of the rapidly developing appreciation of the usefulness of statistical methods in industry and manufacturing and the accompanying increase in requests for the services of the committee, it has been recommended to the sponsor bodies that certain other societies be invited to appoint representatives on this committee so as to cover in a more representative way the whole field described in the title of the committee.

W. A. SHEWHART

REPORT OF THE REPRESENTATIVE ON THE BOARD OF DIRECTORS OF THE NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

During 1936, the National Bureau of Economic Research published the following works:

Volumes

30 *Ebb and Flow in Trade Unionism*, by Leo Wolman
31 *Prices in Recession and Recovery*, by Frederick C. Mills

Bulletins

59 Income Originating in Nine Basic Industries, 1919–1934, by Simon Kuznets
60 Measures of Capital Consumption, 1919–1933, by Solomon Fabricant
61 Production During the American Business Cycle of 1927–1933, by Wesley C. Mitchell and A. F. Burns
62 Revaluations of Fixed Assets, 1925–1934, by Solomon Fabricant
63 The Recovery in Wages and Employment, by Leo Wolman

In addition, the Bureau has sought to develop the programs of cooperative research inaugurated last year. Six programs are now under way as follows:

1. *National Income.* The papers on various aspects of the measurement of national income presented at these meetings were prepared at the request of the Conference on National Income and National Wealth of which Simon Kuznets is Chairman.
2. *Prices.* The Conference on Prices, of which Frederick C Mills is Chairman, has been active in forming committees in the textile, oil, steel, coal, and automobile industries.
3. *Real Estate Financing.* The project on Real Estate Financing under David Wickens has made great progress.
4. *Reemployment.* A WPA investigation of reemployment opportunities and recent changes in industrial technique is being carried forward with the cooperation of the National Bureau under the leadership of Harry Jerome.
5. *Financial Research.* At the request of the Committee on Nationwide Research of the Reserve City Bankers Association, the National Bureau has appointed an Exploratory Committee on Financial Research with Winfield Riefler and Ralph Young as Chairman and Secretary respectively. This Committee has prepared an inventory of financial research now under way and a report recommending a five-year program of cooperative research in this field.
6. *Agriculture.* An agreement has been made with the U. S. Bureau of Agricultural Economics for a cooperative study of changes in the balance between agriculture and industry.

The National Bureau has acquired Hillside, an eight-acre property at Riverdale-on-the-Hudson. As soon as funds are raised to furnish and equip this property, it will be used as a center for the further development of the cooperative program.

Publications of the National Bureau may now be obtained through a new form of subscription. One payment of $5.00 per year entitles the subscriber to all bulletins published by the Bureau and to a discount of 33⅓ per cent on all National Bureau books.

WINFIELD W. RIEFLER

REPORT OF THE REPRESENTATIVE ON THE NATIONAL CONFERENCE ON NOMENCLATURE OF DISEASE

Distribution of the *Nomenclature* increased more rapidly during the year 1936 than in any previous year. There are now 270 hospitals known to be using it—an increase of 100 during the year. There is still an unknown number of others more or less acquainted with the *Nomenclature*, or actually using it without our knowledge. The bed capacity of the known users is now well over 170,000. The *Nomenclature* a year ago was being used in all the mental hospitals in Massachusetts; this year the same thing has happened in New York State.

The increasing amount of consultation with hospitals and physicians regarding the use of the *Nomenclature*, and the addition of new terms, or changes in old ones reflects an increasing interest in the *Nomenclature* and its

increasing influence upon medical thought in the practical every day questions of diagnosing diseases. The experience of the National Conference has shown how necessary such an educational campaign has been. On the average, about 50 per cent of the diseases which cause death have been incorrectly named, even when the diagnosis was, or might have been, perfectly clear in the doctor's mind. Such confusion is caused by the use of ambiguous and obscure terms, so that medical statistics on some of the most important diseases are almost valueless to the physician. As a result of the work of the National Conference, this confusion is being gradually replaced by accuracy and clarity.

The work of the National Conference during the past year was supported financially by the Commonwealth Fund, the Carnegie Corporation, and the Metropolitan Life Insurance Company. About fifty hospitals became members of the National Conference and contributed in fees from $10.00 to $50.00 each.

I recommend that the American Statistical Association continue to have a representative on the National Conference.

GEORGE H. VAN BUREN

REPORT OF REPRESENTATIVES ON THE SOCIAL SCIENCE RESEARCH COUNCIL

The Council has pursued during the past year two broadly distinguishable lines of activity. The one involves financing by the Council. It places entirely in the hands of the Council the means of securing results, but is necessarily limited in scope and character to the Council's ability to raise funds. The other involves no financing by the Council. It gives freer rein to Council planning and initiative, but depends for results on voluntary cooperation of other agencies and individuals.

Activities financed by the Council during 1935–36:

in the development of research personnel—

1) eight predoctoral fellowships, open to candidates entering on graduate study, in the amount of $12,200; seven renewals and eight new appointments for 1936–37; and continuation of awards for 1937–38.
2) twenty-four predoctoral field fellowships, open to candidates having completed all requirements for the doctor's degree except the dissertation, in the amount of $39,700; ten appointments for 1936–37; and continuation of awards for 1937–38.
3) thirteen postdoctoral fellowships in the amount of $40,500; one renewal and eleven new appointments for 1936–37; and continuation of awards for 1937–38.
4) special graduate training courses in agricultural economics and rural sociology (Washington, D. C.) with course enrollments numbering ninety-one; and continuation during 1936–1937.

in improvement and dissemination of research materials—

5) preparation of a *Manual on Methods of Reproducing Research Materials* (in press).

in promotion of research projects—

6) completion of a study of population redistribution in the United States, published in one volume and four monographs.

7) final revision of a study of the measurement and growth of capital in the post-war period, and prosecution of a study of real estate financing—sections of a broad study of banking and credit in relation to economic stability.
8) initiation of studies related to social security legislation—
   a) agencies and personnel in the field
   b) Federal relief experience during the depression: description of development of policies and analysis of effects
   c) unemployment relief practices and policies in the State of New Jersey
   d) veteran's pensions in relation to old age security programs
   e) financial experience of governmental old age pension systems in other countries
   f) coordination of administration of the social insurances in other countries
   g) composition of the labor market; supply, character, distribution, recent changes, and seasonal and cyclical fluctuations.
   h) regional labor markets
   i) recording and analysis of administrative policies and practices of the Federal Social Security Board
   j) administration of public employment offices
   k) administration of unemployment insurance
   l) administration of old age assistance
   m) Federal-State administrative relations
   n) administration of grants-in-aid to local authorities in England
9) continuation of study of the Works Progress Administration and related programs
10) completion of study of the "label" codes under the National Recovery Act
11) forty-eight grants-in-aid to scholars of proved competence to assist in the completion of research of special significance, in the amount of $22,100; and forty new grants to be available in 1937–38

Activities during 1935–36 not financed by the Council beyond expenditures for planning, advice and promotion:

in relation to research organizations—

1) promotion of conference and cooperation among university social science research organizations and among students of different sciences in geographical areas or in particular fields of inquiry
2) advice to various agencies on organization, procedure, personnel and research programs
3) participation with the National Research Council and the American Council on Education in (a) a technical advisory committee on research to the National Resources Committee, and (b) in a committee of review of the Laboratory of Anthropology at Santa Fe, New Mexico

in relation to personnel—

4) study of qualifications of a selected group of applicants for entrance to graduate schools

in relation to research materials—

5) planning of nation-wide inventory of archives, manuscripts and general historical materials, and for reproduction, indexing and digesting of materials. (Taken over by Works Progress Administration.)

in relation to research projects—

6) planning of studies in the field of social security (of which a number have been noted among activities financed by the Council), with incidental service to government
7) planning of studies in the field of public administration (of which a number, particularly in relation to the administration of social security, have been noted among activities financed by the Council), with incidental service to government

8) planning by committees of continuous development of existing nuclei of knowledge around selected points
9) planning of studies of the social effects of economic depression
10) survey of research in the field of forest economics

in relation to the social utility of the social sciences—

11) planning of studies on the role of freedom of inquiry and utterance in society

The Council met four days during the year in September and April.

During the past year there has been a continuation of the generous support of the operations of the Council by the Carnegie Corporation of New York, the General Education Board, the Rockefeller Foundation, the Julius Rosenwald Fund, and the Russell Sage Foundation. New grants made to the Council in 1935–36 totalled $319,250, of which $150,000 was for fellowships; $25,000 for national grants-in-aid; $10,000 for Southern grants-in-aid; $18,750 for general administration; $80,000 for studies of administrative aspects of social security; $20,000 for a study of administrative aspects of the Tennessee Valley Authority; and $15,500 for regional studies of the labor market.

SEYMOUR L. ANDREW
WILLIAM A. BERRIDGE
EDWIN B. WILSON

REPORT OF THE REPRESENTATIVE ON THE SECTIONAL COMMITTEE ON STANDARDS FOR GRAPHIC PRESENTATION

This committee was formed in 1926 by representatives of some 25 engineering, statistical and research organizations under the sponsorship of the American Society of Mechanical Engineers. The present chairman is Col. Willard T. Chevalier, Vice President of McGraw-Hill Publishing Co. The committee is made up of a number of subcommittees, two of which reported progress during the past year.

The Subcommittee on Engineering and Scientific Graphs, W. A. Shewhart, Chairman, has been engaged during the year in the preparation of a monograph on Engineering and Scientific Graphs for Publication, which is to be a companion report to "Engineering and Scientific Charts for Lantern Slides," prepared in 1932 and issued by the American Standards Association.

The Subcommittee on Preferred Practice in Graphic Presentation, A. H. Richardson, Chairman, has completed a monograph entitled "Code of Preferred Practice for Graphic Presentation—Time Series Charts." This pamphlet is designed to codify the principles and procedures which preferred practice has indicated can profitably be followed in the preparation of time series charts. The Code, consisting of some 68 pages of text and illustrations, was issued in April 1936 and can be secured at $1.00 a copy from the American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.

A. H. RICHARDSON

REVIEWS

Elements of Probability, by H. Levy and L. Roth. Oxford: Clarendon Press. New York: Oxford University Press. 1936. x, 200 pp. $5.00

This important work on probability is not exactly a textbook nor a comprehensive treatise but occupies a position somewhere between the two. The object of the book is an attempt at unification of the various points of view from which probability may be approached and to "provide a detailed criticism of the various self contained theories of probability that have been advanced from time to time." The plan is summed up in, "in our analysis of situations relevant to probability, we have discovered three possible fields of study, all in some way interrelated and each a partial approach to the general problem;

(1) a mathematical theory of arrangements;
(2) the frequency of actual occurrences;
(3) the psychological expectation of a participant."

The authors have taken the view that, "Probability is an essential of scientific method and that a probability estimate however it is approached has to be seen and interpreted as a guide in scientific procedure."

A short historical introduction is followed by a very interesting chapter on "The Scope of Probability" subdivided into sections on "The Meaning of Chance," "On the Definition of Probability," and "Mathematical Determinism." This chapter gives a thorough review of the many angles from which the theory of probability has been approached and the various attempts that have been made to establish a sound logical foundation.

Chapters III, IV, V are devoted mainly to considerations of mathematical probability and the connection with statistics usually found in the older books on probability. The definition of probability used is, "If there is a class of N letters containing n letters a, then the probability of a letter specified as belonging to the class N, being a letter a is n/N." This probability is designated "mathematical probability." After derivations of the addition and product formulas, Tchebychef's problem, Stirlings theorem, and Bernoulli's theorem with its extensions and its relation to the normal law are taken up. (Bernoulli's theorem in these chapters covers the connections of probability with the binomial theorem.)

A chapter is devoted to the extension to continuous distributions, and a number of classical problems such as Buffon's needle problem and the random walk problem are discussed. No specific mention is made of the paradoxes that arise in this type of problem, but suggestions of their presence are made in connection with some of the problems.

Chapter VIII on "The Empirical Theory of Distributions" takes up the crucial question of how the mathematical theorems of the earlier chapters can be logically combined with empirical data to enable predictions to be made about actual events. The chapter discusses frequency distributions,

hypothetical populations, some of the so-called statistical constants, the Gaussian law, and the other most common forms of hypothetical populations. The authors make a rather unusual distinction between "mean" and "average." When some member of a class necessarily takes on the measure denoted by the arithmetic mean the word "mean" is used, but there need be no member of the class which takes on the "average" measure.

The last chapter on "The Use of Probability in Scientific Induction" gives in its fifty pages a very clear and unique presentation in broad lines of the problem of sampling. The four elements in any scientific statistical problem are the sample, the population, an hypothetical population, and a process of sampling (design of experiment). In this chapter a mathematical form is given in which these four elements are associated, and the two problems of deducing the sample from a given population and of deducing the population from a given sample are put into mathematical symbolism. Many numerical problems illustrate the process, and Bayes theorem and the method of maximum likelihood are introduced into the discussion. Two dimensional distributions are considered and lead to brief discussions of regression and correlation. The chapter ends with tests of significance in connection with small samples and other tests of significance. On the whole, this chapter gives the reader an excellent birds-eye view of the problem of sampling.

Many problems of both the drill type and the thinking type are scattered through the book. Some of them are well known classics, but many are new.

A. R. CRATHORNE

University of Illinois

Statistical Methods for Research Workers, by R. A. Fisher. Sixth Edition. Edinburgh: Oliver and Boyd. 1936. xiii, 339 pp. 15 shillings.

This valuable handbook continues to grow. The materials of previous editions, which were reviewed in this Journal for 1927 (p. 411), 1928 (p. 346), 1930 (p. 381), 1933 (p. 374), and 1935 (p. 118), are included with slight alteration and amplification in details. In addition, the present volume contains examples illustrating methods of fitting polynomial regression curves to grouped data and of applying a new test of homogeneity for data with hierarchical subdivisions. The latter, illustrated by the results of a genetic experiment with peas, is *Example* 15.1, p. 111; not Section 15.1, as stated in the preface.

The table of significant values of z in the analysis of variance has been extended by the addition of a table for the probability level .001, computed by Dr. W. E. Deming. "Such high levels of significance," writes Professor Fisher, "are especially useful when the test we make is the most favorable out of a number which *a priori* might equally well have been chosen." For this and other reasons extensions of other tables in the book to more numerous probabilities would be useful. It is not always realized how profound a modification and extension of modern statistical methods is still needed to

deal adequately with this problem of seemingly significant results that have arisen as a result of a conscious or unconscious process of selection from among a larger number of variates or of tests, of which those proving to be insignificant are usually not mentioned. A case in point is the conventional textbook method of choosing the greatest among a considerable number of time series correlations with varying lags. Until the mathematics of this subject is worked out, a rough but fairly good practical expedient is to decrease the probability one is willing to call significant, as the number of coefficients from among which the maximum is to be chosen is increased. But to apply this method it is necessary to have tables with smaller probabilities than .01.

HAROLD HOTELLING

Columbia University

Sul Calcolo Della Variazioni Stagionali Dei Fenomeni Economici, by Mario de Vergottini. Trieste, Italy: R. Università di Trieste. 1935. 192 pp. L. 20.

Essai sur les Variations Périodiques et leur Mensuration, by Liebmann Hersch. Rome, Italy: "Metron" Library, Series B. 1935. 184 pp. L. 25.

Any statistician interested in indices of seasonal variations will find Mario de Vergottini's book an invaluable source of information. The general setup of this excellent monograph is similar to that of Professor Irving Fisher's well-known work on index numbers. Its central part is devoted to a compressed but concise presentation of twenty-five different methods proposed for calculation of seasonal variations—as far as I know, the most comprehensive survey of this kind yet in existence. It is preceded by a general introductory discussion and analysis of different statistical measures of "seasonal periodicity." On the basis of this theoretical discussion supplemented by examples of application of each of the twenty-five methods to three empirical time series, the author compares in the last part of the book the result obtained by different methods and analyzes the comparative advantages of different procedures. To be sure, he does not attempt to invent or even to designate an ideal formula but is rather inclined to think that the selection of an appropriate method can be made only in reference to a concrete problem at hand.

De Vergottini enumerates four conditions which according to him must be satisfied by any adequate method of statistical analysis of seasonal variations:

1. Seasonal values must represent as accurately as possible the actual seasonal variations, which in concrete cases indeed cannot be discerned with complete accuracy.
2. The sum total of separate values (of a time series) after elimination of seasonal variations must equal, for every annual interval, the corresponding sum total of the original data.
3. After elimination of seasonals, the data must reveal no significant regularities in the interrelation between different monthly values or the monthly and the mean annual values.
4. The shape of the time series after elimination of seasonals must not be

in variance with the cyclical movement which at least for certain periods might be known on the basis of some other data.

The author is aware of the fact that only points two and three approach the definiteness of a quantitative test whereas the other two constitute rather broad requirements open to very different theoretical and empirical interpretations.

Repeatedly referring in a general way to theoretical concepts or schemes underlying any statistical procedure, de Vergottini does not discuss the comparative merits of such different types of hypotheses. This reticence, however, in no way impairs the usefulness of the volume as a technical handbook on seasonal variation analysis. The attached bibliography covers the literature of the subject in Italian, German, French and English.

Professor Hersch's book resembles de Vergottini's monograph in so far as it also deals with periodical variations from a formal point of view of statistical technique. It covers wider ground by taking into consideration not only seasonal but also cyclical variations. On the other hand, his point of view appears to be rather narrow. The entire discussion is limited to development of nine types of standard indexes which are supposed to supply a complete statistical description of all fundamental characteristics of any type of periodic movements. The problem of decomposition of time series and of statistical determination of its periodic components is entirely left out of consideration. The 10 characteristics covered by Professor Hersch's indexes are as follows: (1) arithmetic average, (2) the part of a period during which a given phenomenon moves above (and below) its average, (3) number of summits, (4) the value of the moments of the extremes (the mean maximum and minimum), (5) amplitude of variations, absolute and relative, (6) deviation from the average, absolute and relative, (7) deviation from term to term, (8) coefficients of concentration, (9) coefficients of steepness and "evenness," (10), coefficient of symmetry.

The selection of these typical characteristics as well as the particular choice of appropriate statistical measures is for obvious reasons rather arbitrary. In particular, Professor Hersch has a great liking for his index of concentration σ_d: the standard deviation divided by the average absolute deviation (from the arithmetic average). He correctly states that whenever all monthly data are equal, σ_d reaches its lower limit $+1$ and shows that the maximum concentration ($+2.45$) is attained whenever all positive deviations are concentrated in one and all the negative in another single month.

Vergottini indicates in his excellent critique of Professor Hersch's procedure that in case the sum total of negative deviations exceeds the average value of the series (which does not and cannot contain negative items), they cannot possibly be concentrated in one single point but must be spread over two, three, or more months. Accordingly the value of the upper limit of σ_d falls below $+2.45$ and becomes variable, which obviously impairs the practical usefulness of such an index.

WASSILY LEONTIEF

Harvard University

Is There Enough Gold? by Charles O. Hardy. Washington, D.C.: The Brookings Institution. 1936. x, 212 pp. $2.50.

This is an excellent handbook for those now asking themselves the question which constitutes its title.

Dr. Hardy begins by defining that question. He puts it thus: "Given a general restoration of industrial activity, would the prospective gold supply be sufficient to support the prospective volume of world trade at gold price levels as high as those of 1924–29, without drastic changes in the monetary institutions which determine the amount of gold that is needed?"

The book was published in May, four months before France devalued her gold unit, followed by the like action of Switzerland and Holland, and followed soon after by the "gentlemen's agreement" between England, France, and the United States, looking toward concerted action and, possibly, the virtual replacement of the gold standard by a managed currency throughout the world.

If that happens, as so many of us fondly hope, it might seem that Dr. Hardy's question and his answer to it will be purely academic. For, by further devaluations, the number of dollars, francs, pounds, etc. could certainly be increased at will so that there would most surely be "enough gold" if not too much. In fact the perpetuation of the present devaluations might well produce the same result. Only if France goes back to her pre-September franc and if America goes back to its pre-Roosevelt dollar and England to its pre-1931 pound—all of which seem unlikely—will the question answered by Dr. Hardy have any meaning of practical importance.

Dr. Hardy also assumes that reserve requirements and similar rules and regulations affecting credit currency are to be substantially the same as they have been. "The assumption of this study is that in any general restoration of the gold standard the relationships between gold reserves and money volume which were established by world monetary regulations and customary practices in the years just before the recent collapse of the gold standard would be re-established and continued indefinitely, except for changes which have accrued since 1929 that seem likely to be permanent, such as the withdrawal of gold coin from circulation in the United States."

Dr. Hardy studiously avoids any general discussion of whether such a return to the original status quo is desirable. His sole question is, if we do so return, will there be enough gold. To this question he gives an affirmative answer. The data and reasoning by which he arrives at this conclusion seem to me convincing.

Dr. Hardy is a severe critic of his predecessors in this field. He rejects Cassel's results and method and points out how generally, in the past, predictions of a scarcity of gold have proved false. He is somewhat less critical of Kitchin.

Dr. Hardy points out that, in past periods, silver has been almost coordinate with gold and that, therefore, the sum of gold and silver money should often have been considered in our statistics rather than gold alone.

He cites Wilcoxen who showed that "the amount of metallic money actually required in the nineteenth century to support prices was much lower than the figure generally taken on the basis of Cassel's or Kitchin's researches."

He concludes that most prior estimates, including those furnished to the Gold Delegation of the League of Nations "greatly exaggerated the prospect of an early and drastic decline of the world's gold-mining industry, and particularly of the output of the Transvaal, the leading producer."

On the other hand, he thinks that the industrial consumption has generally been underestimated and accepts Edie's method by which he (Hardy) arrives at a quarter of a billion dollars (at $20.67 an ounce) annually so consumed in the period 1913–28. But for special reasons in the next decade he finds 100 million dollars a year reasonable.

His final verdict is that the problem in the immediate future "will be one of absorbing a surplus rather than compensation for a deficiency." But he adds: "equally serious is the risk that the world will commit itself to a gold standard with reserve requirements, and consequently with growth requirements, based on the swollen holdings that the depression has given us, making certain that the shortage which the Gold Delegation imagined will become a reality" after all.

In this statement, Dr. Hardy steps out of his role of a mere calculator of the adequacy of future gold under his prescribed hypotheses to point out the dangers which may confront us under hypotheses quite different from those he originally assumed. In other words, in spite of himself, he has to point out the need of a wise monetary management even if we do return to gold. A wise monetary management is, undoubtedly, a necessity for the future. No "automatic," trust-to-luck gold standard ought again to be tolerated.

Dr. Hardy believes, contrary to many, that "inadequacy of the world gold supply was not a factor contributing to the decline of prices between 1924 and 1929, and there was no immediate prospect of a serious decline in gold production before the coming of the depression."

As to future policy, he advocates "some plan under which a large part of the existing world gold stock would be segregated in extraordinary reserves" —which is exactly what Secretary Morganthau has since started to do, in December 1936. Here again Dr. Hardy finds himself advising wise management.

The last fourth of the text consists of a reprint of Dr. Hardy's pamphlet, "The Warren-Pearson Price Theory." For some reason, Dr. Hardy displays animus in his criticism of these writers, some of which criticism could readily be answered.

The first and chief of the three Appendixes is an interesting and valuable contribution by Rufus Tucker, "The Myth of 1849" to show that the effect on the price level of the gold discoveries in California and Australia in that period has been greatly exaggerated.

IRVING FISHER

Yale University

Wholesale Prices in Philadelphia, 1784–1861, by Anne Bezanson, Robert D. Gray and Miriam Hussey. Philadelphia: University of Pennsylvania Press. Industrial Research Department, Wharton School of Finance and Commerce. Research Studies XXIX. 1936. xxiii, 443 pp. $4.00.

This volume is a continuation of *Prices in Colonial Pennsylvania*, by the same authors. Naturally, as the material is more abundant for the later period, the statistical treatment can be and is more analytical than in the preceding volume. This statistical analysis is skillfully tied to non-statistical history. The study is therefore of great value not only to economists interested in the study of prices and business cycles but also to students of American history and especially the history of Pennsylvania. It furnishes a model for similar investigations elsewhere.

The outstanding feature of the book, corresponding to the plot in a novel, is an index by months of the wholesale prices of 186 commodities from 1784 to 1861, supplemented by another based on 205 commodities from 1818 to 1861. This index is the best that has been published covering that period, as it contains more commodities and is calculated as a geometric, not an arithmetic, average. Nevertheless it differs little in general appearance from its predecessors. Compared with the Warren index it shows slightly more of a war-peak in 1814 but slightly less tendency to extreme fluctuations at other times. From 1785 to 1861 it falls about 6 per cent, whereas the Warren index falls about 3 per cent. Such a discrepancy in 75 years is hardly worth mentioning, except as an interesting illustration of compensatory errors, or perhaps it would be better to say compensatory differences of method. The Pennsylvania index gives farm products much less weight than the Warren index. This by itself would tend to make the former fall as compared with the latter, because non-farm products had much more of a down trend than farm products, but the use of a geometric average of relatives instead of an arithmetic average and the heavier weighting of wines and spirits completely offset that tendency.

On this matter of weights the Pennsylvania economists assume that their index is unweighted and argue that an unweighted index is the only practicable type, since the proper weights for an index number depend on the purpose for which it is to be used and require information concerning relative consumption or trade that is not available. These are both good points, but they overlook the stark fact that some system of weights cannot be avoided. The choice of items and the consolidation of related items constitute a choice of weights.

When the authors reduced their 205 original price series to 157 for the purpose of calculating their index, they were weighting. It seems strange that they retained only one item to represent bread (plus one for flour and one for wheat) while retaining ten items for wine, plus three for rum, two for whiskey, and one for brandy. Is there any purpose for which an index number can be used for which wine and spirits deserve such high weights, amounting to more than 10 per cent of the total index? Would it not have been better for every purpose, even if wholly accurate weights cannot be ascertained, to

give cotton and wool at least as much weight as Spanish brown and white lead? Can a weight of seven for tropical spices be justified when corn and hog products have together a weight of only five?

To the present reviewer the chief value of this book is the light it sheds on the internal complexities of the price structure. The diverse movements of various groups are strikingly similar to these that have attracted attention in recent years. This diversity is shown in trend and in cyclical swings, in year to year variability, and in frequency of monthly price changes. The group indexes show that from 1784 to 1861 farm crops rose 16 per cent in price, while farm derivatives (commodities made from farm crops) fell 5 per cent and imported foods fell 29 per cent. This is what one would expect with improvements in processes of manufacturing and in navigation. But why should wines rise 112 per cent while condiments fell 65 per cent?

Although the over-all trend of domestic and imported commodities was not greatly different, imported commodities had a much higher and earlier peak during the war of 1812 and did not share the price boom of the 30's. Similarly the difference between the curve of industrial prices and that of agricultural prices was not so much in the over-all trend as in the swings. Industrial commodities, like imports, had a high prices peak in 1814 and did not share the boom of the 30's; they also rose much less than agricultural commodities in the 50's.

Industrial products formed the group that showed the most stability from year to year, especially after 1822; the least stable groups were farm crops and farm derivatives. The most stable individual commodities, considering the extent of change from year to year, were rod iron, country steel, Spanish brown, glass, linen sheeting, and Madeira wine. The least stable were corn, rye, currants, lemons, ginger, and turpentine. If stability is measured by frequency of change from month to month then the most stable were steel, hoop and sheet iron, mahogany, and tin plate in about that order; the least stable were linseed oil, plaster of Paris, pig lead, whale oil, pearl ashes, and beeswax. Commodities ready for consumption tended to have less frequent changes and industrial raw materials more frequent as time went on, mainly, the authors believe, on account of improved means of transportation and communication.

The contrasts in flexibility and sensitivity shown by these price series resemble those revealed by the components of the B.L.S. index in recent years, although it is obvious that they cannot be explained on the assumption that industry was controlled and prices "administered" by big corporations. Then, as now, commodities differed in the nature of the demand for them and in the relative proportions of capital and hired labor entering into their costs of production, and in the extent to which the supply was controlled by the producers, individually or collectively, or by natural forces.

Diversities in trends and in cyclical fluctuations thus seem to be fundamental and permanent characteristics of the price structure. If this is true it follows that a currency policy designed to keep commodity prices stable

is bound to be more difficult than is anticipated by those trusting souls who believe that the purchasing power of money can easily and accurately be measured by any single index of wholesale commodity prices. (The reviewer does not accuse the authors of sharing this delusion.)

This book therefore is useful not only for what it purports to show but also as an illustration of the fact that many economic phenomena of the present not only had their origin in the past but were already fully developed long before they were discovered by statisticians.

The type, tables, index, and general arrangement are admirable. Detailed figures of prices of each commodity by months are promised in a supplementary volume.

RUFUS S. TUCKER

Westfield, New Jersey

The Behavior of Money, by James W. Angell. New York: McGraw-Hill Book Company, Inc. 1936. xiv, 207 pp. $3.00.

This volume represents a statistical investigation of a number of important aspects of the behavior of the money supply of the United States, including the relationship between the stock of currency and the volume of bank deposits, the relationship of currency and bank deposits to various measures of general economic activity, changes in the distribution of money among Federal reserve districts, the exchange or turnover velocity and the circular velocity of money and their relationship to other phases of business activity.

Among the most important conclusions reached are the following: (a) that the ratio between currency in circulation and the volume of bank deposits is not substantially constant either in short periods or long, though both are correlated loosely with the activity of business; (b) that both the quantity and the exchange velocity of circulating deposits (individual plus governmental demand deposits adjusted for duplications) move with or after—not before—the rough aggregate of general measures of production, trade, and financial transactions, but not with any one of these taken separately or with commodity prices; (c) that changes in the proportion of the national total of circulating deposits in each region are significantly related to changes in that region's share in the total volume of business; (d) that the quantity of circulating deposits and their exchange velocity are apparently influenced by financial transactions in greater degree than is usually recognized, so that efforts to control business based on the fluctuations of exchange velocity are likely to be seriously misdirected; (e) that fluctuations in the national money income in 1909–1928 were much more intimately associated with those of the stock of circulating money than with those of circular velocity. From 1929 to 1932, however, the association of national income with circular velocity was somewhat closer than its association with the money stock.

The study makes no pretense of being exhaustive, and the conclusions drawn are presented cautiously. The data which have to be used in work of this sort, especially for the earlier years, are very treacherous, and no two investigators are likely to reach the same solution of some of the problems of adjustment and interpolation. The debatable points, however, generally relate to small items and have little bearing on the soundness of the conclusions which Professor Angell reaches. Further statistical work would doubtless lead to modification of the details of the argument, but, within the limits which the author has set for himself, the analysis is clear and in most points convincing. It forms a valuable addition to our financial literature.

A conclusion drawn on page 77 seems to the reviewer inadequately supported, even for a tentative statement. This is the implied approval of "the implication either that security transactions temporarily tie up substantial quantities of deposits, or that other types of activity (presumably chiefly financial) which do involve the use of substantial quantities of deposits themselves move in a fairly intimate short-period connection with security transactions." The curves in fact show very little relationship between the New York deposit relatives and the volume of stock sales for 1919–26 (aside from the fact that both rose a little in 1924 when there was a great rise in business activity), and no resemblance in 1930–34. Even in 1927–29 the short period fluctuations show litt esemblance, aside from the sharp peak at the end of 1929 which apparently reflects the taking over by New York banks of loans on account of "others." Eiteman's work has, I think, pretty well ruled out the hypothesis that the stock market itself, in periods of activity, ties up any significant volume of deposits. Indeed at a later point (p. 155), Angell concludes that the quantity of money tied up in the financial class of transactions is "comparatively small." The two passages together, however, give more support to the doctrine of the absorption of credit by the stock exchange than the data, in the reviewer's judgment, warrant.

Question may be raised as to the conclusions stated on pages 150–53 concerning an upward trend of the ratio between exchange velocity and circular velocity for 1921–32 and its significance as evidence that units of money were changing hands a larger and larger number of times on the average as they passed through the consumer-producer-consumer cycle. The author notes that "so far as financial transactions are responsible for the 1929 peak in the ratio, this peak must be viewed as essentially spurious for our present purposes." But the ratio between exchange velocity and circular velocity in fact shows no significant upward trend in 1921–26. The computed trend as measured by a straight line fitted to a 1919–32 base, seems to be almost entirely due to this 1929 peak and to the comparatively high level of the ratio in 1930–32. A trend line fitted to stock sales for the entire period would show about the same upward trend as that of the ratio, which suggests that the outburst of speculative activity and the continued maintenance of stock sales at a relatively high level in 1930–32 may account for the entire rise in the ratio of exchange velocity to circular velocity.

With reference to seasonal fluctuations in exchange velocity one comment may be offered as a supplement to Professor Angell's discussion. The intra-month cycle in debits discussed on pages 108–10 appears to reflect in a significant degree the influence of income tax payments. The index of debits for the third week of each four income tax months (March, June, September, and December) is in every case above the annual average of third-week items, whereas the third-week index for every other month, except February, is below the annual third-week average.

There is an error in the right-hand scale of the Chart on page 44. Professor Angell writes me that the scale should be read in hundreds of millions, not billions.

CHARLES O. HARDY

The Brookings Institution

Population Movements, by Robert R. Kuczynski. Oxford: Clarendon Press. 1936. 121 pp. $1.50.

The book contains a series of three public lectures given at the University of London in March, 1936, together with an appendix. The first lecture, after a brief review of the state of the available statistics on the population of the world, discusses the peopling of America (North, Central, and South America) with whites and blacks; the second summarizes the author's well-known views on mortality, fertility, and the balance of births and deaths; and the third discusses the possibilities of increasing the birth rate and the relation between population trends and public opinion. An extensive appendix of 41 pages presents tables of data and estimates of the white and black races in Africa, 1835 and 1935, and in the Americas, 1835 and 1935, together with sources and comments. The title, Population Movements, is thus a term selected as comprehensive enough to cover the subject matters discussed without being intended to promise a thorough treatment of population movements.

The material on the growth of the white and black populations in the Americas and the estimates of the numbers of each race in America and Africa represent a critical summary of existing information on the subject. In the section entitled "The Peopling of America with Blacks"—a curiously worded phrase—the author accepts an estimate of about 12,000,000 Negroes imported prior to 1826 (500,000 into the United States), with a resulting Negro population in 1826 of nearly 10,000,000; in the last 100 years an additional 2,000,000 Negroes were imported, and at the end of the period the total population had grown to nearly 40,000,000. A similar discussion of the growth of the white population contains the statement that "the total number of whites who until 1820 emigrated and did not return was at least 3,000,000"—Kuczynski believes that a thorough investigation would lead to a much higher figure. The number of whites in the Americas in 1835 is estimated at 18,600,000. Immigrants from Europe from 1820 to 1935 who did not return are estimated at some 35,000,000.

It is surprising to find the statement, p. 17, that "mortality among the

whites was higher still than among negro slaves," following a sentence, 'for a very long time the peopling of America with whites encountered even greater difficulties than the peopling of America with blacks." For evidence a few cases are cited of severe losses in early settlements. But such a statement is suspect, because it is counter to all the evidence of modern times based upon adequate data and seems improbable because of the evidence previously given of heavy mortality among the Negroes and the relatively much more rapid growth of the white population.

Kuczynski believes that immigration into British North America during the period from 1700 to 1800 is underestimated "by gratifying the sentimental theory that the enormous increase of the white population in the United States from 250,000 in 1700 to 4,300,000 in 1800 was almost solely due to procreation on the part of the old sturdy stock."

In connection with the estimates of the two races attention is called to the varying definitions of white, colored, and Negro in census usage. In particular, the classification of the census of 1921 in the Union of South Africa is cited: Europeans or White Persons; Asiatics—Persons born of, or descended from, races belonging to the continent of Asia, including Parsees and Syrians; Natives; and Coloured Persons. Kuczynski continues, "the policy of the Union of South Africa is thus to segregate three groups of pureblooded persons . . . and to combine in a fourth group (Coloured Persons) all pureblooded persons who are neither Europeans nor Asiatics nor Bantus, and all persons of mixed races." I have not been able to consult the census of 1921, but the Official Year Book #6, containing figures for the period 1910–1922, published in 1924, and containing the data of the population census of 1921 states, p. 132, "it will be observed that the terms white population and coloured population used in previous issues of this book have now been changed to European and non-European population respectively. Certain elements of the non-European population cannot in all cases be described as 'coloured,' though the number of such is small." The census of 1926 of the European population included 275 Syrians, 3 Armenians, and 27 Turkish, etc., as well as 569 "Hebrews so returned" in the nationality tables; one would infer that Syrians were thus considered as of European or of white race, at least in the 1926 census. Of the Asiatics (1921) 96 per cent were Indians, of whom a small number were classed to the Parsee religion; the remaining 4 per cent would include Chinese, Japanese, Malay, etc., in all 6,392. Thus the original error of including some white groups among the "coloured," which in point of numbers was never serious, has been corrected by a change of terminology; and to take the present group of European as equivalent to white is in practice not to introduce a very large numerical error.

From the point of view of numbers involved a more serious difficulty is found in Kuczynski's acceptance of the results of the census of Puerto Rico. Many persons with mixed Negro and white blood there report themselves as white, with the result that the 1,000,000 whites enumerated in the census include a great number who would be considered as colored in the United

States. This may explain Willcox's "overlooking" the million white persons in Puerto Rico in his estimate of 300,000 whites in North and Central America outside of Mexico, Cuba, the United States, Canada and Newfoundland.

The other chapters of the book need not detain us long. The discussion in the second chapter has been presented elsewhere for the most part more adequately. The principal object of Chapter III is to suggest that there may be reasons not yet adequately examined or weighed that would lead to favoring an increased population. It seems strange in such a discussion to find no mention of the question whether an increased population would lead to a higher or to a lower standard of life. The statement that "the American farmer would be better off if there were now 145 millions within the Union instead of 128" is represented as an "incontrovertible fact." But would that not depend upon how many of the additional 17 million were on farms and expecting to make their living from farming? Would it not also depend upon how large a proportion of the 17 million were added to the 10 to 15 million unemployed? It certainly seems arguable that with the larger population the standard of living of the entire nation, including the farmers, might be lowered.

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Administration of Workmen's Compensation, by Walter F. Dodd. New York: The Commonwealth Fund. 1936. xviii, 845 pp. $4.50.

In presenting this volume Mr. Dodd and the Commonwealth Fund have rendered an important and timely social service. For a quarter century compensation of industrial accidents has been our only form of social insurance, and as the administration of old age pensions and unemployment insurance is being planned we are fortunate in the possession of this careful presentation of workmen's compensation experience and the lessons with which it is replete.

The principal structural features of industrial accident compensation, as delineated by the author, are as follows:

1. Laws in forty-six states and three territories, a Federal law for civil employees of the National Government and another for longshoremen and harbor workers.

2. Premiums are paid solely by the employer. In all but four jurisdictions employers must insure their risks or furnish proof of financial ability to meet compensation payments. Security of compensation is sought through (a) insurance in private insurance companies, (b) insurance in competitive or exclusive state funds, (c) safeguards imposed on self insurers. Seven states have exclusive state funds and self insurance is permitted in all but seven jurisdictions. The predominant method is that of underwriting by stock or mutual companies under private management.

3. An amount of compensation based in practically all states upon the average wage earned before the injury but in some states within minimum and maximum limits. Many states provide that the average weekly earnings

shall include overtime and the market value of board, lodging, fuel, and gratuities. Two states pay flat amounts of weekly benefits and all states leave large discretion to those who compute the wage, even states that provide definite rules for computation of wage. All state laws permit some degree of commutation into lump sum settlements, and some allow special or additional compensation for rehabilitation purposes.

4. Provision within limits of medical treatment for the injured employee in most states, the cost of which, with a few exceptions, is borne by the employer or insurer.

5. All but a few jurisdictions require employers to report accidents, and some states require insurance companies to report accidents in the plants of their client employers.

6. Rate making could not be handled by each state separately. The National Council on Compensation Insurance, consisting of sixty-three stock carriers, twenty mutual carriers, four reciprocal or interinsurance exchanges and five state funds, has made advances in this direction, but final rate-making power resides in many organizations.

7. Merit rating of employers by insurance carriers which seeks to distinguish between individual plants in the same industries and to vary their insurance rates in proportion to hazard is growing in importance.

8. Some laws are administered by the courts, but a majority of the laws are administered by commissions. In a few states administration is vested in a single official. There has been a growing tendency to vest the administration in the same body that administers other labor laws. The experience shows that efficient administration would cost 15 per cent or more of benefits.

9. The great majority of claims are paid by the administrative officials without contest. In contested cases the usual procedure is first a hearing and then a review after the possibility of introducing new testimony before a board or superior officer, then an appeal to the trial court or to an intermediate court of view, and finally a further judicial review by the highest state court.

The American workman has derived substantial benefits from the legislation. It was estimated in 1930 that the total amount of compensation paid to injured workers is $240,000,000 per year, not including an additional $72,000,000 paid for hospital treatment and medical aid. This constitutes a total of $312,000,000 incurred because of 2,107,000 injuries among 19,683,500 workers. There is a general tendency toward liberalization of the laws and their interpretation. The amounts of compensation payments tend to increase, the waiting periods to be reduced and provisions making compensation retroactive to the date of injury if disability lasts longer than a certain period are now more common. Provisions with regard to medical care, the coverage of occupational diseases, and the reopening of cases have been liberalized, and there has been a steady upward trend in the extent of medical benefits provided.

The following are some of the outstanding faults cited: self insurance is

too easily secured in many states, and a number of self insurers fail, leaving claims unprovided for; insurance in private insurance companies is the predominant method, but a number of insurance carriers have gone out of business during the depression and were unable to meet their legal obligations to insured workmen; although state funds seem to cost employers least, one authority holds that they have a poorer record than the best private carriers in promptness of benefit payment, are generally undermanned, and in some cases their employees are not of the best; the provision in most states that insurers shall be responsible for paying medical benefits has led to exploitation of the health of the employee; appointment of commissioners in the first instance is usually political—"political influence at the time of appointment and continued political influence with the party in power at the time of reappointment are certainly as influential as efficient service in the field of compensation"; the test of the depression has not been satisfactorily met by the insurance companies or by those charged with imposition and administration of governmental restrictions; to some extent the steady increase in compensation costs has been due to defects of administration.

Those who feel that the states should be free to experiment in social insurance will be able to examine in Mr. Dodd's volume the results of state experimentation run riot. The author asserts that laws have been enacted "in too much of a hit-and-miss fashion." There is great diversity among the laws, and benefit provisions are not alike in any two states. There is variation with respect to what injuries shall be reported; the length of time allowed in which to report injuries; the line of demarcation between the administrative and quasi-judicial functions exercised by non-judicial bodies on the one hand and the functions exercised by the courts on the other; whether or not employers shall be required to insure the risk or furnish proof of financial ability to meet payments; the length of the waiting period; whether all, some, or no occupational diseases shall be covered; the organization and scope of judicial review; and with respect to the relative values placed upon disabilities concerning the same parts of the body. After a development of twenty-five years, two states are still without legislation, and only eight states, three Federal jurisdictions, and three territories allow full medical benefits for the entire duration of disability.

Some of the material has special import for the administration of unemployment insurance: in the framing of compensation laws one of the most important problems was to devise a scheme which would give protection by spreading the risk as widely as possible over the industry as a whole; it is necessary to have complete information about the injury, the nature of the employment, the wages paid, the character of the disability, and the condition of the claimant at different stages of recovery; experience in reporting accidents suggests that the shorter the time set by law for the making of reports by employers, the sooner will the majority of reports be obtained; one of the most difficult problems of noninsurance is the fly-by-night em-

ployer; the problem of computing the average wage is one of the most difficult in the administration of compensation; there seems no proper basis for treating the small employer differently from the large employer with respect to his inclusion under the law; for the supervision of administrative work a single officer has been regarded as better than a board; the great mass of small employers may, unless they are able to spread the risk, have their business wrecked by a single accident; political influences are not absent in the courts of the United States, and such influences have been ever present in the administration of workmen's compensation; there is need for a greater uniformity in the laws and for a trained and permanent personnel; it is difficult to determine the extent to which merit ratings operate to decrease accidents, for the proportionate increase or decrease in premium rate will in many cases be too small to have much effect.

The author has little to suggest for the improvement of this patchwork pattern of compensation other than closer co-operation among the states. He holds that the solution of the problem of disuniformity rests with the states but recognizes that all efforts in this direction have proved ineffective. If this is the experience in a quarter century of development, to seek closer co-operation among the states seems a counsel of despair.

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Ebb and Flow in Trade Unionism, by Leo Wolman. New York: National Bureau of Economic Research. 1936. xiii, 251 pp. 36 tables, 5 charts. $2.50.

There are two ways of writing labor history. One may put oneself in the very position of the leaders of the movement performing the continuous experimenting with the general community and with labor itself, of which labor history is the written record. By this method of approach the reader is taken over a succession of concrete situations, resembling so many campaigns, and his attention is centered on the actual process of "trial and error," the decisions made, the obstacles encountered, the catastrophes and victories, and the institutions shaped. The generalizations which emerge deal with the characteristics of the American social habitat, the basic group psychologies on either side of the line, and the types of "industrial government." The second method of approach is that of a "historical atlas of unionism." Here the dominant interest is not the particular situation, the strategy employed, or the shape of the ultimate institutional structure, but all of these are reduced to a two-dimensional expression.

The author's method is obviously the second one. Yet as an American labor student second to none in this generation for his intimate contact with industrial labor problems, both as an adviser of leaders and as an "activist" on his own accord, Professor Wolman has made his "quantitive" treatment simultaneously a most outstanding success as labor history writing of the

first-mentioned variety. It is as if in watching the expansion and contraction of the red-tinted area on the geographical globe one could be made aware at the same time of the advances and retreats of the red-coated armies of Britain.

Little needs to be said about the statistical methods employed by the author. This work is a continuation of his well-known earlier one, *The Growth of American Trade Unions, 1880–1923*, and does what can be done with the data available. The data are admittedly imperfect, as unions are not primarily statistical bureaus but organizations pursuing definite practical aims, which at times may be furthered either by concealing membership data or even by deliberate misrepresentation. The author has pursued his old objective of determining the extent in unionization for the country as a whole as well as by occupations. He gives the percentage of non-agricultural employes organized as 10.2 for 1930 comparing with 19.4 in 1920 (the high watermark of American unionism) and 9.9 in 1910. It is regrettable that data are lacking with regard to the sectional extent of union organization, as the degree of penetration by unionism into the less urban sections appears of deciding moment in its quest for recognition as a national institution.

As a discussion of the problems of unionism the chapters entitled "Centers of Unionism" and "The Next Years" are most illuminating. In the former the author presents the best explanation yet given why the mining, building, transportation, and printing unions have constituted more than 60 per cent of the total membership, in good years and bad. Noteworthy is the small proportion of the total represented by unions in manufacturing, if printing and clothing are disregarded. He also discusses in this connection the important factor of the shifts in the localization of industries which are geographically competitive, such as textiles, shoes, and clothing. In the last chapter he brings out the crucial rôle of Government since the advent of the New Deal, which produced a new orientation in unionism, and ends up by saying that "the unfolding of present policies of industrial regulation and collective bargaining may well expose unions in this country, as it has in others, to governmental regulation of their policies and acts."

In the reviewer's opinion the chapter on "Representation Elections" might have been omitted without injuring the quality of this excellent work.

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National Income and its Elements, by Robert F. Martin. New York: National Industrial Conference Board, Inc. 1936. xiii, 134 pp. $2.50.

Computation of figures for the national income is still in an experimental stage. The various methods and estimates used must therefore be examined and the different approaches explored before any one of them can finally be accepted as the authoritative method.

The calculation worked out by the National Bureau of Economic Research in cooperation with the Department of Commerce[1] is outstanding because it is based on the widest range of material. Any new computation should therefore be compared with this one to ascertain whether and in how far it offers an improvement.

The publication of the National Industrial Conference Board differs in various ways from the work of the National Bureau of Economic Research and the Department of Commerce. It applies somewhat different concepts and uses different methods for estimating some types of incomes and for breaking down the national income totals.

The author distinguishes between two types of incomes. One of them is the "realized production income" which belongs, in his opinion beyond any doubt, in every income calculation. As to the second, "other accountable realized income," he presents this separately, so that these items may or may not be added to the "realized production income," as desired. In this way, the author does not impose his special theoretical opinion upon those making use of his figures. His relativism goes too far, however, in his answer to the question whether agricultural rental and benefit payments should be included, excluded, or even deducted in the calculation of the national income. He assumes that the answer depends on the approval or disapproval of the Agricultural Adjustment Program.

Mr. Martin includes governmental interest payments (war debts!) in "production income;" this is highly questionable.

Mr. Martin's "accountable realized income" corresponds to the "income paid out" in Kuznets' terminology. He doesn't attempt to estimate the "accrued income" or "income produced." Kuznets' "income produced" (as distinguished from "income paid out") contains two elements: undistributed current profits (or disbursements of assets) and increments or decrements in the valuation of assets. Martin's elimination of the second element is, in my opinion, an improvement, because the flow of income and changes in property valuations ought to be clearly distinguished. Martin's elemination of "undistributed profits" and the corresponding negative items is, however, no improvement at all. What he should have done was to define this concept more clearly and revise its method of calculation.

The total estimates of Martin's "accountable realized income" do not differ greatly from the Department of Commerce figures for "income paid out." The greatest difference exists in the figures for agricultural incomes. Since the method applied in the computation of these figures will not be published by the National Industrial Conference Board until later, this difference cannot be discussed at this time.

The National Industrial Conference Board presents a new calculation of the distribution of the national income by states, thereby carrying on the

[1] S. Kuznets, *National Income, 1929–1932*, Senate Document, 73rd Congress, 2nd Session, No. 124, 1934; U. S. Department of Commerce, *National Income in the United States, 1929–1935*, Washington, 1936.

work of the Brookings Institution[2] and the earlier work of the National Bureau of Economic Research.

Martin's breakdown of the figures according to the reliability of the estimates is also useful. He is quite optimistic, however, in assuming that the approximate margin of error in the estimate of salaries and wages for 1929 averages only 3.5 per cent.

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Unemployment Relief in Periods of Depression, by Leah H. Feder. New York: The Russell Sage Foundation. 1936. 384 pp. $2.50.

At a time when thoughtful people everywhere are wondering what our approach should be toward a future, long-range policy on unemployment relief, it is particularly interesting to look back over the experience of the past eighty years. Miss Feder surveys in her book the measures adopted to meet this problem in certain American cities in the depressions of 1857–1858, 1873–1879, 1893–1897, 1907–1908, 1914–1915 and 1920–1922.

It is discouraging in considering the future to be reminded of the frequency during this period of depressions sufficiently severe to require special measures to relieve the unemployment which they caused. It is also somewhat discouraging to note how little of the experience so painfully acquired during one depression remained as the starting point for approaching the problems of the next. And yet it is clear from the evidence presented in Miss Feder's study that there has been a slow and steady accretion of experience, gradually crystallizing into policy and the historical development which we recognize as social trends.

For example, Miss Feder describes how in the course of these eighty years the unit, both for planning and operation, has gradually widened from the neighborhood, racial, or religious group to the community. A tendency toward state coordination of effort is also indicated, and one can even see in President Harding's Conference on Unemployment in 1921 the seeds of what has become in this depression a recognition of unemployment as a nationwide problem and of its relief as a Federal responsibility.

One of the most interesting aspects of this historical development is the relationship between public and private agencies in the administration of unemployment relief. The apparent insistence of the private agencies that relief administration was exclusively their field over some years deserves more attention and analysis than Miss Feder has been either willing or able to give it in the scope of this study. One infers that social workers opposed the mass relief methods of most public agencies on the grounds that they

[2] M. Leven, H. Moulton, C. Warburton: *America's Capacity to Consume* (The Brookings Institution, 1934).

were at once demoralizing and extravagant, insisting that their developing case-work techniques be applied in an individualized approach to unemployment relief. Since, however, the results of the individualized approach are described largely in terms of their restrictive effect on the case load, one wonders if in the opinion of the author (or the social workers of the period, since it is not always clear for whom Miss Feder speaks) the best relief methods are those which succeed best in keeping the apparent and articulate need at a minimum. It is possible that the obviously undesirable soup kitchen had still the virtue of demonstrating to a too frequently complacent world that there were thousands of people who were sufficiently hungry to endure the humiliation of this form of relief in order to get something to eat. This becomes interesting when one considers that we have in a sense gone forward toward a new kind of mass relief in the form of unemployment insurance and work for the unemployed. This movement toward and again away from individualized approach to the problem of unemployment relief is to me the most provocative question raised by the material assembled in this book.

AUBREY WILLIAMS

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Unemployment and Prospects for Reemployment in Massachusetts, with Particular Reference to Manufacturing Industries, by Donald H. Davenport and John J. Croston. Boston, Massachusetts: Harvard University, Bureau of Business Research. Bureau of Business Research Studies Number 15. Volume XXIII, Number 6. August, 1936. viii, 73 pp. $1.00.

Recent studies of unemployment data compiled by the Federal Census of 1930 and the state enumerations of 1934 have contributed to a much better understanding of both the magnitude and the character of the problem, although there is still a pressing need for a more adequate Federal census. The present monograph analyzes the data collected in Massachusetts. Depression changes are examined in the light of long-run trends in population and employment within the state. Special attention is given to manufacturing, separate studies of some seventeen industrial classes being included within the report.

In the opinion of the authors the crux of the unemployment problem lies in the manufacturing industries. These industries have been suffering from declining trends in employment since 1919. This secular character of unemployment makes it unlikely that these industries will be able to reabsorb their unemployed in the immediate future. The lack of new industries important enough to take up the slack in unemployment and the improbability of much further expansion in trade, transportation, and service industries without a marked recovery of manufacturing activity makes the economic outlook in Massachusetts dark in the predictable future. In these conclusions

the authors stand on firm ground amply supported by the statistical material of the report.

When, however, the authors turn to the solution of the unemployment problem, their position appears less tenable. Emigration of labor is recognized as a possible solution but an unsatisfactory one. This view fails to see clearly the full implications of the problem. If unemployment is "partial," i.e., confined to certain industries or industrial centers, labor transference is the only permanent solution. If, on the other hand, unemployment is "general," i.e., if the demand for labor at the general level of wages is such that the unemployed would not be fully reabsorbed, even though an optimum redistribution of labor supply among industries and industrial areas exists, the unemployment problem is national in character and involves changes in either the incomes or the productivity of the factors of production. The slowing up of population growth, the absolute decline in manufacturing employment, and the migration of gainful workers to other industrial states suggests that a significant part of the unemployment problem in Massachusetts is "partial" in character and therefore can be solved only through a movement of surplus labor to new industries and industrial areas where employment opportunities are greater.

The apprehension of the authors over the possible adverse economic effects of migration of the surplus labor upon Massachusetts could be justified only if it is assumed that the movement became so pronounced as to reduce the potential power of the state to produce. The unfavorable competitive position of Massachusetts in respect to taxation and advanced labor legislation possibly lends support to this view. There are, however, grounds for a more hopeful outlook. Mounting taxation in other industrial states, together with increasing Federal regulation of labor, suggests new elements in the situation which are favorable to Massachusetts. The adoption of Federal legislation on the subject of maximum hours, minimum wages, and child labor would do much to improve the competitive position of the state in this respect.

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International Transactions of the United States, by Ray Ovid Hall. New York: National Industrial Conference Board, Inc. 1936. xv, 230 pp. $3.00.

In this work Dr. Hall has given us a survey of the international balance of payments of the United States from 1922 through 1935, the value of the work being enhanced by the fact that the author has been primarily responsible for the compilation of the Department of Commerce annual bulletins on the subject and may be given full credit for having raised the status of balance of payments compilations from guess work to a science.

The present work may be considered a textbook in the compilation, pres-

entation, and interpretation of balance of payments estimates that should serve as a guide to statisticians in this and other countries. The art of accumulating and auditing the vast amount of statistical material entailed in these statements of international transactions has developed so greatly during the past 14 years, owing chiefly to the work of Dr. Hall, that no one can be considered competent to discuss the related national and international financial questions nor to pass judgment on such controversial matters as war debts, transfer problems, tariffs, exchange restrictions, etc., who has not mastered the many facts and concepts set forth in this volume and in the previous annual compilations of the author.

There are a few shortcomings in the present work, and it is to be regretted that in the final table the 1935 figures, which could have been assembled at the time of publication, were not included. Chapter XI gives signs of having been loosely edited and contradicts itself in parts. For example, although admitting that "the worst blight which the depression visited upon international trade, shipping and finance is the great body of new tariffs and exchange restrictions," Dr. Hall nevertheless comments rather disparagingly on the United States policy of reciprocal trade agreements which have been the most effective, in fact the only effective, force now operating to rid the world of these encumbrances. On the whole, however, the editing has been well handled, although bearing signs of having been cut down drastically from what must have been a considerably greater mass of original material.

There are some echoes of the once famous dispute between Dr. Hall and the Commerce Department authorities, culminating, unfortunately, in the severance of Dr. Hall's connection with the Government. A minor instance is in the omission of the term "Jones invisibles," named after Dr. Hall's former division chief, and in faint traces of spleen which the editors have not completely eradicated. For example, Dr. Hall waxes vehement in his insistence on prorating 60 per cent of all errors and omissions amongst certain conjectural items and denounces the Commerce Department for not following this practice since his departure. Much is to be said however, for refusing to force figures to balance, and the reviewer believes that users of the balance of payments items in practical financial work would be better served if balance of payments compilations contained both the adjusted and the unadjusted totals. On the whole, the reviewer is inclined to agree with Dr. Hall that errors would be minimized if apportioned in this way, but his book really brings out forcibly the impossibility of leaving these adjustments in the official figures to the judgment of a single individual.

Interestingly enough, Dr. Hall suggests, as one justification for the Commerce Department compilations, that "it was of some public service to have unbiased estimates of liquor smuggling," but actually, it was the suppression of these estimates by the Commerce Department that served as one of the reasons for Dr. Hall's quarrel with authorities.

Dr. Hall's study reveals conclusively the superficiality of the pseudoscientific reports in account form, prepared by George N. Peek, which attempted to prove that our international transactions over a period of years had re-

sulted in a net loss to the nation and concluded therefore that foreign trade was detrimental to the national interests. Dr. Hall comments: "that our nation has lost a few billions from its private long-term lending to foreigners could have been better established directly, by studying the investments themselves, rather than resorting to a crudely compiled Balance of Payments . . . certainly it was unnecessary to compile a Balance of Payments to prove that America has lost much of the war debts."

Emphasizing that no economist can have any proper conception of the importance of any single item in the balance of payments without knowing the total turnover, debits plus credits, Dr. Hall demolishes the Brookings Institution's studies of Germany's capacity to pay and the transfer problem and their later reports on the war debts question, which, "viewed separately by persons unfamiliar with the astronomical dimensions of America's total international dealings, seemed unmanageably bulky"; actually, they were "never more than about one-eightieth of our total foreign transactions and were often less."

The reviewer, from daily experience in analyzing foreign balances of payments for the practical purpose of determining transfer problems and capacities to pay foreign obligations, can testify that net figures of tourist trade, freight charges, or any item (except balancing items) are worthless. Dr. Hall brings out the fallacies entailed in pairing off one item against another, even in pairing off the debits and credits under the same category, such as using a net import or export surplus or a net tourist or credit expenditure. In analyzing "Promotions and detractions," a study originated by Dr. Hall, the author showed that it is only exceptionally that items can be paired off one against the other; that, whereas some international transactions are largely passive, others actively promote increased or decreased expenditures in one direction or the other. Foreign purchases of American merchandise do not necessarily promote American purchases of foreign goods, and there is no necessity that the two should balance; purchases of American goods by foreigners may, on the contrary, cause Americans, enriched thereby, to spend more money as tourists abroad, or add to charitable or emigrant remittances, or any one of a score of other items.

Discussing tariffs, Dr. Hall points out that "tariff reductions would increase our imports very much less than is popularly supposed." This is true. Our dutiable imports are only about 40 per cent of our total imports and approximately 25 per cent of our aggregate trade and service (invisibles) imports. Nevertheless, in correcting a popular fallacy, Dr. Hall goes to the other extreme and thereby fails to point out, in this part of his discussion, the fact that high tariffs (and more particularly quotas, exchange restrictions, and other trade barriers) are seriously detrimental to the interests of consumers in the countries imposing these restrictions and have at the same time been a major factor in the past depression through their depressing influence on world commodity price levels and through the curtailment of the actual volume of trade.

In analyzing the question as to whether "trade follows the loan," Dr. Hall

shows that this has not been true, as a matter of fact, in the United States. He fails to point out, however, that the experience of other countries has not been analogous. England has been particularly careful to see that its foreign loans and investments have been earmarked for the purchase of English goods, not merely at the time of the original investment but for decades thereafter, so that English trade with many parts of the world is largely predicated upon preferential purchases in the English market by British-owned enterprises in foreign countries.

From the viewpoint of the technical expert, the 84 pages of auditing notes contained at the end of the book should be invaluable to compilers in foreign countries; likewise, the explanation of the "complete stub policy" which precludes overlooking any important item by listing all potential transfer entries, whether or not statistics are available at the time of compilation. Dr. Hall's division of the transfer entries is convenient and intelligible, viz. (1) commodity trade; (2) miscellaneous invisibles; (3) long-term capital movement; (4) short-term capital movement, and (5) pure cash. In connection with this division, Dr. Hall emphasizes that the balancing item in the balance of international payments is not gold but the entry "Net Change in International Bank Accounts."

In sum, Dr. Hall's work may be set down as one of the most important contributions to the study of international financial transactions that has been compiled and should be compulsory reading for all economists who completed their academic education prior to 1922.

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New York City

A Graphical Survey of the Canadian Textile Industries, by J. A. Coote. McGill Social Research Series: No. 4. Montreal: McGill University. New York: Oxford University Press. 1936. 248 pp. $1.75.

As the title implies this study provides a graphical picture of economic conditions in the Canadian textile industries. It covers for the most part the period 1917–1933, although data are given in certain charts and tables for earlier years and for 1934. According to the author, the study is an attempt to present in chart form the statistical information available in the publications of the Canadian Government about the textile industries of Canada. It is intended to encourage the use of these statistics through presenting them in a form that enables the reader to study the more important trends and relationships without the labor of assembling the necessary data from a great number of official reports and tables.

The trends and relationships for six industries are treated in detail, namely for the cotton yarn and cloth, woollen cloth, woollen yarn, silk (including artificial silk or rayon), hosiery and knitted goods, and carpets, mats, and rug industries. Charts and tables are given for each industry showing growth in terms of such measures as capital employed, number of em-

ployees, and value of product; distribution by provinces; production and import trends; changes in equipment; price movements; and certain ratios called "economic trends" including capital per establishment, capital per employee, and value of product per employee. The graphs for each industry are introduced by brief texts in which attention is called to the more significant movements revealed by the graphs.

The last chapter of the monograph is devoted to the presentation of productivity trends in which indexes of employment, volume of production, wages, and cost of living are compared. An index of productivity is obtained by relating the index of number of wage earners to the index of volume of production. There is no indication that account was taken of any changes in volume of production which might have arisen from changes in the quality or the nature of goods being produced; moreover the employment figures used were on an annual basis and presumably represented the average employment for the year. At best indexes of productivity thus derived trace only the broad relations between output and employment. From a study of these indexes the author arrived at these conclusions:

"In general there does not appear to have been any improvement in the productivity of the worker. Cotton shows a rising overall trend since 1925 with a decided increase in 1933, but it is impossible to say as yet whether this has been sustained. Woollen cloth production also shows this improvement in 1933 but before that time practically no improvement since 1925 is indicated. Woollen yarn productivity has been going down since 1926 with a final value of less than 90 in 1933. Hosiery and knitted goods show a falling trend for three years after 1926 with a subsequent improvement, but on the average are not yet up to the level of 1926.

"There are no price index figures available for all silk taken together so that only the one index for productivity can be calculated. The situation it shows, however, is very different from the other industries studied. From 1926 there has been steady and continuous improvement, and the index of productivity stood at 143 in 1933. This is evidently the product of an expanding industry attractive to capital, which is able to take advantage of the latest and best technical methods available."

Those who have reason to be interested in the Canadian textile industries should find this work most helpful. On two counts the monograph could have been considerably improved. Its appearance would have been greatly enhanced if more attention had been given to the charts. They look to be work charts; erasures are evident on several, and the cross-section background stands out so much in certain charts that the curves are hard to follow. More attention to draftsmanship and the reproduction of the charts on a white background with a simple grid would have added much to the study with probably little additional cost. This point is emphasized only because the monograph was prepared to encourage and facilitate the use of government statistics of the textile industries, particularly by business men.

Students of industry would have found the study more useful if the data presented had been accompanied by some statement of their limitations.

For example statistics are given on capital employed in certain tables without any indication of their significance; from other tables it appears that these statistics refer to total assets. A brief discussion of the form in which these data were collected, together with consideration of possible variation in interpretation by reporting establishments, would have been welcomed by many readers. Such explanations could have been segregated from the main portion of the text wherever they seemed to prevent clear-cut, straight-forward presentation.

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Income in Agriculture 1929–1935, by Robert F. Martin. New York: National Industrial Conference Board, Inc. 1936. N. I. C. B. Studies Number 232. xviii, 168 pp. $2.50.

The author of this volume was formerly in charge of the Income Section of the Bureau of Foreign and Domestic Commerce, which is responsible for the current official estimates of national income. He therefore brings to the reader the results of considerable experience and thought.

The volume contains valuable figures on farm income by major geographic divisions which have not heretofore been available. But its more important contribution consists in centering attention upon the inadequacies and limitations of existing data. In fact, one of the major considerations of the report is the use to which the estimates of agricultural income have been put in connection with the administration's program of agricultural relief. In attempting to disclose the erroneous conclusions drawn by some from current estimates of agricultural income, the author himself undertakes the difficult task of comparing the income of farm operators with the income of those in other pursuits. His success is, of course, only limited.

The statistical and conceptual difficulties encountered in estimating national income in general are greatly multiplied when an attempt is made to compare the incomes of special groups within the nation. When groups are compared, the concepts of income must of necessity be shifted from the purely economic considerations of market values to considerations of well-being involving intangibles which cannot be assigned economic values.

Not the least of the problems is that of definition. Who is a farmer? The census enumerates some six million persons as farm operators. Many of these, however, are farmers in name only; some have other occupations; others are so-called subsistence farmers who live almost apart from the main current of economic life. Among the farm operators are many who are responsible for large enterprises requiring education, training, and great ability; on the other hand, many are sharecroppers with a minimum of education and training and with no special aptitude. The disproportionate geographical distribution of farmers also adds to the difficulties of comparing farmers with other groups. Mr. Martin, for instance, points out that the

South comprises about 54 per cent of the farm population and only 23 per cent of the nonfarm population. This factor alone may account for a large portion of the difference between the income averages of the agricultural and nonagricultural groups.

The estimates which Mr. Martin proposes for comparison with nonfarm incomes differ from those of the Department of Agriculture principally in two respects: he calculates the farm produce consumed on the farm at retail rather than farm prices and, in addition, makes an allowance for the income of farm operators earned in other occupations. On this basis he finds that the average occupational income of farmers on the whole compares favorably with that of entrepreneurs and employees in nonfarming pursuits. At this point it is perhaps well to ask whether it would not be better to compare farm entrepreneurs with nonfarm entrepreneurs so as to avoid at least the superficial discrepancy caused by excluding employees in one case and including them in the other. But even a more detailed analysis would, of course, be necessary to make the comparison conclusive.

The use of retail prices for the computation of the value of farm products consumed by farm families raises a question of consistency which suggests the complicated nature of the problem of measuring comparative well-being of different groups. Should not some allowance also be made for the fact that many services which city dwellers receive at comparatively low prices cost the farmer very much more? Education and certain types of amusements, for example, are on the average priced differently to farmers and others because the difference in location involves an added cost (largely transportation) to the farmers. The fact that these types of services are only minor in the farmers' budgets does not dispose of the question. If the "farm prices" of these advantages were as low as city prices, the farmer would perhaps consume more.

In a short review it is impossible to cover all the points which appear significant in connection with such an important subject as agricultural income. Some readers will undoubtedly have questions with regard to the items entering into the estimates. For instance, should not some allowance be made in the occupational income of farm operators for the rental value of the farm home? The separation of the home from the farm as a business may appear somewhat artificial, especially when an attempt is made to allow for the price differential on produce consumed on the farm. Whether defaulted taxes and interest are operating expenses is also still open for question. Such farm income as is ascribed to defaults may be merely a consumption of capital, since the equities of the farmers are affected.

Although the author has not been completely successful in solving the statistical problem of comparing the well-being of farmers with that of other classes of the population, he has advanced the thinking on the subject. The failure to reach a solution is not a reflection upon Mr. Martin but is inherent in the problem itself.

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Social Work as a Profession, by Esther Lucile Brown. New York: Russell Sage Foundation. Second Edition, 1936. 120 pp. 75 cents.

This monograph, enlarged in its second edition, is one of a series by the same author concerning the status of several emerging professions. It brings again to attention the question of how social work is attaining professional status. Dr. Brown directs the major portion of her discussion to education and training for social work, the development and influence of national social work organizations and of the Association of Schools of Social Work, the number of persons engaged in social work, and a comparison of salaries of social workers, primarily social case workers, in selected cities. The anomaly between emphasis on graduate education and specialization and the low salaries paid to social workers is aptly presented.

The classification of schools of social work with respect to their graduate status and their university relationships, the size of the student body and the number of students who receive advanced degrees, the academic requirements for admission to schools of social work, and the individualistic nature of the curriculum of the various schools will probably be the most discussed sections of the monograph.

The author is more at ease and helpful in presenting statistical data and in interpreting them than in discussing the more intangible but equally important information on trends, scope, and content of social work both in theory and in practice. The monograph dismisses these aspects of professional social work with a few paragraphs of discussion and omits additional reference to important bibliography which could provide the necessary supplemental reading. Although written primarily with the view that "the information may be readily utilized by vocational counselors and those who are striving to make the professions contribute more widely to the welfare both of their members and of society," the book presents so little of the various phases of social work, particularly group work, preventive and educational work, and community organization, that it seems to miss its main objective. The newer developments in social work are omitted or quickly passed over.

This reviewer believes the author attempted to cover too much area in too few pages to present adequately the movement toward professionalism, which task requires a discussion of the present in terms of the background of the past and in relation to the prospective future. It is difficult to encompass such a discussion in a small monograph.

EDITH MILLER TUFTS

Taxation and Public Policy, A discussion of the Current Problems of American and European Public Finance. Edited by Paul Studenski, with a foreword by the editors of *The Nation*. New York: Richard R. Smith. 1936. 267 pp. $3.00.

This is a reprint, with additions, of a series of articles written for *The Nation* by various contributors during the winter of 1934–1935. As republished here, the original contributions have been revised and somewhat

expanded. Certain statistical material has been added by the editor, with explanatory comments. Appendices contain an editorial from *The Nation*, the President's tax message of June 19, 1935, and extracts from R. H. Jackson's testimony on the revenue bill of 1935 before the Senate Committee on Finance. The title given to this testimony is "The Economics of the 1935 Revenue Act."

The book is less unified than the title suggests. The several articles are quite separate, each being the viewpoint of the author on a subject in which he is more or less of a specialist. A. E. Buck has written on public budgeting, Philip Cornick on local taxation, Clarence Heer on the coordination of Federal, state, and local finance, John K. Norton on educational finance, F. L. Bird on municipal credit, William Withers on Federal finance, M. S. Kendrick on state finance, Gerhard Colm on European finance, and Hugh Dalton on the incidence of war costs. The editor has provided a preliminary survey, a paper on the proper financing of the next war, and one on the tax program of the future.

Such integration as may be found is supplied by the editor. The general viewpoint expressed in his papers, which does give point to the title, is that there should be even more taxation than at present. His emphasis upon this policy as a means of promptly retiring the public debt is more fortunate than his enunciation of it as a basis for the new tax system. The state is said to be a partner in business enterprise and a claimant to a part of the revenue it helps to earn. The new tax system must rest on ability plus the new theory of state partnership (p. 19).

This is not in any sense a new theory. Economists have always recognized the productive significance of government. The thing that is not settled is just how productive much of the current extensions of state activity will turn out to be. Adolph Wagner asserted that there was virtually no limit to the state's productive contribution, and the prewar German rulers proceeded to spend enormously on armament on the theory that everything done by the state was right. It scarcely needs argument to show that, although the state may be an active, useful partner in production to a certain point, it can also be a dead weight, benumbing partner beyond that point. A theory of taxation that accepts state partnership without qualification as a justification for unlimited tax exactions is seriously deficient.

The most conspicuous lack in this volume is the absence of any consideration of the present level of public expenditures and of the ways of reducing it. No attention is given to the possible utility of the existing range of public services nor to the vested interests already created in these services, which tend to perpetuate them regardless of any question of public advantage. The impression created is that there should be more taxing and spending for services as well as for debt retirement. The main implication, namely, that this is the surest way to a more abundant life for all, remains to be established.

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